JANUARY, 1915.

ENTOMOLOGICAL NEWS

Vol. XXVI. No. 1.

Juan Gundlach, 1811-1896.

PHILIP P. CALVERT, Ph.D., Editor.
E. T. CRESSON, Jr., Associate Editor.
HENRY SKINNER, M.D., Sc.D., Editor Emeritus.

ADVISORY COMMITTEE:

EZRA T. CRESSON. J. A. G. REHN.
PHILIP LAURENT. ERICH DARCKE. H. W. WENZEL.

PHILADELPHIA:
THE ACADEMY OF NATURAL SCIENCES,
LOGAN SQUARE.

Entered at the Philadelphia Post-Office as Second-Class Matter.

ENTOMOLOGICAL NEWS

published monthly, **excepting August and September,** in charge of the Entomological Section of the Academy of Natural Sciences, Philadelphia, and the American Entomological Society.

ANNUAL SUBSCRIPTION, $2.00 IN ADVANCE.

NEW SUBSCRIPTIONS $1.90 IN ADVANCE. SINGLE COPIES 25 CENTS

Advertising Rates: Per inch, full width of page, single insertion, $1.00; a discount of ten per cent. on insertions of five months or over. No advertisement taken for less than $1.00—Cash in advance.

☞All remittances, and communications regarding subscriptions, non-receipt of the NEWS or of reprints, and requests for sample copies, should be addressed to ENTOMOLOGICAL NEWS, 1900 Race Street, Philadelphia, Pa. *All Checks and Money Orders to be made payable to the* ENTOMOLOGICAL NEWS.

☞Address all other communications to the editor, Dr. P. P. Calvert, 4515 Regent Street, Philadelphia, Pa., from September 15th to June 15th, or at the Academy of Natural Sciences from June 15th to September 15th.

☞PLEASE NOTICE that, beginning with the number for January, 1915, the NEWS will be mailed only to those who have paid their subscriptions.

The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news from any source likely to interest its readers. The author's name will be given in each case, for the information of cataloguers and bibliographers.

TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" for each number into the hands of the printer four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.

☞ The printer of the NEWS will furnish reprints of articles over and above the twenty-five given free at the following rates: Each printed page or fraction thereof, twenty-five copies, 15 cents; each half tone plate, twenty-five copies, 20 cents; each plate of line cuts, twenty-five copies, 15 cents; greater numbers of copies will be at the corresponding multiples of these rates.

1,000 PIN LABELS 25 CENTS! At Your Risk. (Add 10¢ for Registry or Checks)
Limit: 25 Characters; 3 Blank or Printed Lines (12 Characters in Length.) Additional Characters 1c. per 1,000.
In Multiples of 1,000 only; on Heaviest White Ledger Paper—No Border—6-Point Type—About 25 on a Strip—No Trimming—One Cut Makes a Label. SEND MS ORDER WITH COPY. FOR ANY KIND OF ARTISTIC PRINTING LARGE OR SMALL, INDEX CARDS, MAPS, SEX-MARKS, LABELS FOR MINERALS, PLANTS, EGGS ETC. IF QUANTITY IS RIGHT, PRICE IS SURE TO BE.
C. V. BLACKBURN, 77 CENTRAL STREET, STONEHAM, MASSACHUSETTS
Orders totalling less than 5,000 (all alike or different) double price.

1.

2.

3

ECOLOGY OF DRAGONFLY NYMPHS—LYON.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVI. JANUARY, 1915. NO. 1.

CONTENTS:

Lyon—The Ecology of the Dragonfly Nymphs of Cascadilla Creek (Odo.) 1
Ramsden—A new Pieris from Cuba (Lepid.) 15
de la Torre Bueno—The Cimex on American Bats (Hemip., Heter) 16
Van Duzee—Descriptions of three new species of the Dipterous genus Sciapus with a key to the North American species..... 17
Rau—The Longevity and Mating Habits of Dichromorpha viridis Scud. (Orth.)..... 27
Townsend—Corrections to Paper on Andean Muscoidea (Dipt.)..... 28
Alexander—A Second Bromeliad-Inhabiting Crane-fly (Tipulidae, Diptera) 29
Cockerell—The Real Trigona dorsalis Smith Rediscovered (Hym.)..... 30
Girault—Notes on Trichogrammatidae (Hymen.)..... 32
Editorial—Hints on Packing Insects for Transportation 33
Change of Address..... 34
Baumberger—Notes on the Siricidae of California (Hym.)..... 34
Identification of Specimens 35
Laurent—Army Worm Plague in Philadelphia (Lep.)..... 36
Greene—Two Rare Wasps (Hym.)..... 37
Butler—Dragonflies Devouring Winged Ants (Odon., Hymen.)..... 37
Entomological Literature..... 38
H. S.—Review of Seitz's Macrolepidoptera 41
Doings of Societies—Feldman Collecting Social (Dip., Lep., Col.)..... 42
Obituary—August Weismann..... 44
" Charles Sedgwick Minot 47

The Ecology of the Dragonfly Nymphs of Cascadilla Creek (Odon.).

By MARY B. LYON.*

(Plate I.)

CONTENTS.

Introduction 1
Aquatic Situation 2
I Distribution 3
II Epiphytes and Epizoa 4
III Food of the Nymphs 7
IV Efficiency of Shelter 11
Bibliography 14

The work on which this paper is based includes observations on the nymphs of dragonflies occurring in a limited part of Cascadilla Creek near the Cornell University Campus. Representatives of most of the families of this group are found

*Contribution from the Limnological Laboratory of the Department of Entomology in Cornell University.

there. The distribution of the nymphs in the stream bed and in the submerged vegetation has been studied, and is reported on in the following pages. The epiphytes and epizoa attached to the skin of the nymphs have been studied and are here listed for the first time. A whole population of epiphytes consisting of diatoms and other algae, and of epizoa, numbering some Protozoa and other microscopic forms, live habitually upon the backs of members of all families. Special attention has been given to food, which consists of almost any animal small enough for the nymph to hold. It varies, therefore, much in character and abundance according to the season. Chironomids and the young Odonate nymphs are always at hand; mayfly nymphs most of the time, and other forms only at certain seasons. Finally, some experiments to determine the protective value of water weeds as shelter for the nymphs are here recorded.

This study was suggested by Prof. James G. Needham, to whom it gives me sincere pleasure to express my gratitude for his kindly advice and criticism.

The Aquatic Situation.

Along the southern border of the Cornell University Campus, Cascadilla Creek flows swiftly over a bed of rocks and gravel, falls two or three feet over shelving rocks and then divides. One branch soon widens out into a broad sluggish basin and the narrow part of the stream dries up except during the spring and fall overflows. In the summer there is no noticeable current and the basin is then known as Cascadilla Pond. The other branch flows rapidly over a bed of pebbles and gravel for a short distance and then quiets down before joining with the first branch to form Dwyer's Pond.

The grassy meadow shut in by steep slopes on the north and west and traversed by these two branches of the creek, whose banks are partially shaded by trees, is an ideal home for the imagos; while the waters, swift or quiet, with beds of gravel and mud supply the diversity required by the nymphs. (Plate I, Fig. 1.)

I. Distribution of the Nymphs.

There are already on record some general observations on the habitat of dragonflies, as in Needham and Hart, '01, and on their distribution in relation to the velocity of water (Needham, '02). In this paper some further ecological notes are added and the distribution of 30 species, comprising the odonate population of the small area just described, is recorded.

Rapid water forms are few. The damsel-fly, *Argia putrida*, is found under the stones in the swift water above the branching of the creek, and the dragonfly, *Cordulegaster diastatops*, in the nearby gravel. The latter, covered with sand and with the eyes and caudal respiratory opening arched to the surface, lie quietly waiting for their prey to come within reach of their labia. They are provided with two strong claws on each leg with which they are able to crawl over the bottom. The flat, sprawling *Ophiogomphus* lies in the gravel a little farther down stream, where the water flows less rapidly. Everywhere at the edges of the current the damsel fly, *Calopteryx maculata*, climbs awkwardly about the weeds and roots, usually bearing aloft the three caudal gill plates. In this position they can perhaps see their prey more readily as it moves by or is swept past by the current. *Hetaerina americana* is also found on the weeds in rapid water, the imago appearing in the field August 6th for the first time.

Quiet water forms are more numerous. Large numbers of *Gomphus descriptus, G. spicatus, G. villosipes* and *G. sordidus* burrow in the soft mud of the sluggish part of the stream and especially near the head of the pond. A net swept through the debris along the edge of the pond will occasionally catch what seems at first a very dark, almost black leaf, but which on closer examination proves to be the thinnest, broadest and most grotesque of all the nymphs, *Hagenius brevistylus*. Besides these there are little short "masked" Libellulids which lie half buried in the mud or crawl about over the bottom of the pond or on the *Elodea* or other water weeds close to it. *Libellula pulchella, Leucorhinia intacta, Plathemis lydia* and *Pachydiplax longipennis* are all represented in this group.

The Aeshnines and Agrionines climb about on the weeds in the pond or occasionally at the edges of the stream. Of the Aeshnines *Basiaeschna janata, Aeshna constricta* and *Anax junius* are fairly common. Among the Agrionines, *Argia violacea* is common, while *Chromagrion conditum* and *Amphiagrion saucium* are more rare. *Lestes rectangularis* is quite rare. *Ischnura verticalis* is exceedingly common and *Nehalennia irene* equal in numbers to the more abundant species of *Enallagma,* which is represented by *E. antennatum, E. divagans, E. doubledayi, E. ebrium, E. exsulans, E hageni* and *E. signatum.*

There is evidently a seasonal change in the location of the nymphs, at least of those of damsel flies. In the fall, Anisoptera and Zygoptera were abundant in the masses of weeds in midstream, but there were none to be obtained there in the springtime when they were numerous along the edges. During the summer these forms oviposited mostly upon the weeds or algal mats out in the stream. It is evident from this that the eggs hatch and the nymphs remain in the stream until the fall rains make the current too strong, whereupon they move into the edges of the current and then downstream.

II. Epiphytes and Epizoa.

The census of the population which settles upon the backs of odonate nymphs forms an interesting record. Twenty-six nymphs varying in size from 15 to 36 mm. were taken from Cascadilla Pond between April 24 and June 20. They were scraped with a tiny scalpel, the scrapings mounted in water on a slide and studied under the microscope. Diatoms, green and blue-green algae and a variety of protozoa and other microscopic invertebrates were found. (See page 5.)

Diatoms.—Besides the 19 species of diatoms recorded, there were several species of *Navicula* and *Synedra* which were not identified. These two groups were present almost constantly and in abundance, while *Gomphonema* on its long stalks and *Encyonema* in its gelatinous ribbon were frequently present and often exceedingly abundant, *Nitzschia sigmoidea* was very

No.	Date	Nymph	EPIPHYTES: Diatoms: Meiosira	Stephanodiscus	Navicula	Encyonema	Amphora	Gomphonema	Tabellaria	Fragillaria	Diatoma	Synedra	Pleurosigma	Nitzschia	Surirella	Cymatopleura	Cocconeis	Chlorophyceae: Oedogonium	Ulothrix	Microspora	Zygnema	Mougeotia	Spirogyra	Desmid	Chaetosphaeridium	Scenedesmus	Cyanophyceae: Oscillatoria	Phormidium	Merismopedia	Beggiatoa	EPIZOA: Rhizopoda	Ciliata	Flagellata	Suctoria	Rotatoria	Nematoda	Oligochaeta	Crustacea	
1	4-24	AESHNINAE																																					
2	"	Basiaeschna janata	..	..	x	x	..	x	..	..	..	x	..	.....	..	..	..	x	..	..	x	..	..	....	..	..	x	..	..	x	..	..	..	..	..	..	..	..	1
3	"	" "	..	..	x	x	..	x	..	..	..	x	..	.....	..	..	x	x	..	..	x	x	..	....	..	..	x	..	..	x	..	2	..	..	..	..	..	..	2
4	"	" "	..	..	x	x	..	x	..	..	..	x	..	.....	..	..	..	x	..	..	x	..	..	....	..	..	x	..	..	x	..	..	..	..	..	..	..	..	3
5	5-8	.....	..	..	xv	x	..	x	..	..	x	x	..	s	..	..	x	x	x	x	x	x	..	c l	..	x	x	..	..	x	..	1	2	..	2	1	1	..	4
6	5-10	Anax junius	..	..	x	..	..	..	..	..	..	.....	..	s	..	..	..	x	..	..	..	..	..	....	..	..	x	..	..	..	..	..	..	..	..	..	..	..	5
7	"	.....	..	..	x	..	..	x	..	x	..	.....	..	.....	..	..	..	x	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
8	5-16	Aeshna	..	..	v	x	x	..	..	..	..	u	..	s	..	..	x	x	..	..	..	..	..	....	..	..	x	..	..	..	..	..	..	1	..	..	..	..	7
9	6-16	.....	x	..	x	x	x	x	..	..	..	xu	..	s	x	..	x	xc	x	..	..	x	..	....	..	..	x	..	..	x	1	1	3	..	1	..	..	..	8
	"	.....	..	..	x	x	..	x	..	..	..	xu	..	s	..	..	x	x	x	..	..	x	..	....	..	x	..	..	..	..	..	2	..	..	..	..	..	..	9
10	5-8	GOMPHINAE																																					
11	6-9	Gomphus	..	..	x	x	..	..	..	x	..	u	..	s	x	..	..	x	..	..	..	..	..	....	..	..	x	..	..	x	..	..	..	1	..	..	..	..	10
12	"	.....	x	..	x	x	x	..	..	..	..	.....	..	.....	..	..	..	x	..	..	x	..	..	c l	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
13	6-17	"	..	..	xm	x	..	x	x	x	..	u	..	.....	..	..	x	x	..	..	..	x	..	....	..	..	x	..	..	..	..	..	1	..	..	1	..	..	12
	"	.....	..	..	x	x	..	..	..	..	..	x	x	.....	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	x	..	..	..	..	..	..	..	..	13
14	5-8	LIBELLULINAE																																					
15	6-25	Plathemis lydia	..	..	v	..	..	x	..	..	..	.....	..	s	..	..	..	x	..	..	..	..	..	....	..	..	x	..	..	x	..	1	1	..	..	..	..	..	14
16	5-9	" "	..	..	x	x	..	..	..	..	..	.....	..	.....	..	..	..	..	..	..	..	..	x	....	..	..	x	..	..	x	..	2	..	1	..	..	..	..	15
17	7-10	Pachydiplax longipennis	..	..	x	..	..	x	..	x	..	.....	..	s	..	..	..	x	x	..	..	..	..	....	..	..	x	..	..	..	..	1	..	..	..	..	..	..	16
18	5-10	" "	..	..	xv	x	..	x	..	x	..	x c u	..	s	..	..	x	x	x	..	..	..	x	c o	..	..	x	..	x	x	1	2	..	1	1	..	..	..	17
19	"	Leucorhinia intacta	..	..	v	..	..	..	..	..	..	.....	..	s	..	x	..	....	..	..	..	..	..	....	..	..	x	..	..	x	..	..	..	..	1	..	..	..	18
20	5-16	" "	..	..	x	..	..	x	..	..	..	.....	x	s	..	..	..	x	..	..	..	..	..	....	..	..	x	..	..	x	..	1	..	2	..	..	..	..	19
21	5-26	" "	..	..	xm	..	..	..	..	..	..	x	x	s	..	..	..	....	..	..	..	x	..	....	..	..	x	x	x	x	..	1	1	1	..	..	..	..	20
22	6-17	" "	..	..	xv	..	x	x	..	..	..	u	x	s	x	x	..	x	..	..	..	x	..	c l	..	..	x	..	..	x	..	1	..	1	1	..	..	..	21
	"	" "	..	x	x	x	..	..	..	..	..	xu	x	s	..	x	..	x	x	..	..	..	..	....	..	x	x	..	..	x	..	1	..	..	1	..	..	1	22
23	5-8	AGRIONIDAE																																					
24	"	Calopteryx maculata	..	..	x	x	..	x	..	..	..	x	..	.....	..	..	..	....	x	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	23
25	6-9	"	..	..	x	x	..	x	..	x	..	u	..	a	..	..	..	x	..	..	..	..	....	..	..	x	..	..	..	..	..	..	..	..	..	..	..	..	24
26	6-20	Enallagma antennatum	..	..	x	x	..	x	..	..	..	c	..	.....	..	..	x	x	..	..	..	x	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
	"	sp	..	..	.....	.....	..	..	..	..	..	.....	..	.....	x	..	..	x	x	..	..	..	..	....	..	..	..	..	..	..	..	3	..	..	..	..	..	..	26
		Total	2	1	x=22 v=6 m=2	17	4	16	3	6	1	x=11 u=9 c=2	5	s=14 a=1	4	4	7	x20 c 1	8	4	3	7	2	cl 3 co 1	1	2	18	1	1	14	2	18	8	8	8	2	1	1	

Navicula—x small species unidentified. v Navicula viridis. m Navicula major.

Synedra—x unidentified species. u Synedra ulna. c colonies of Synedra.

Nitzschia—s Nitzschia sigmoidea. a Nitzschia acicularis.

Oedogonium—c Oedogonium ciliatum.

abundant but was not found at all upon damsel-fly nymphs. With this exception the more common forms seemed to be generally distributed among the families, regardless of the difference in the habitat of the nymphs.

OTHER ALGAE.—*Oedogonium, Oscillatoria* and *Beggiatoa* were common; other forms appearing occasionally in scattered filaments. The nymphs which climb about just above the bottom made an ideal dwelling place for *Beggiatoa.*

RHIZOPODA.—Rhizopoda are represented by *Amoeba lobosa* and *Difflugia.*

CILIATA.—Because of the greater number of sessile forms the ciliates were far more numerous than any other group of animals. *Epistylus plicatilis, E. nympharum* and *Vorticella* became exceedingly abundant as the season advanced. Late in June some Enallagmas were almost completely covered with them, even the antennae bearing great white clusters. *Vaginicola* and *Cothurnia* are also sessile forms. *Paramoecium* and *Euplotes* appeared a few times.

FLAGELLATA.—*Euglena viridis* and *Euglena deses, Phacus pleuronectes, Anisonema acinus* and *Peranema tricophorus* compose the list of flagellates.

SUCTORIA.—The Suctorians, *Podophyra quadripartita* and *Acineta tuberosa* were found only on Gomphines and Libellulids, but on these in great abundance.

ROTIFERA included *Floscularia, Notholca, Monura, Philodina.*

Chaetonotus and two undetermined rotifera, *Anguillula,* an oligochaete worm and an ostracod complete the list of animals found in this population.

The Zygoptera and some of the Aeshnines, especially *Anax junius,* which climb about more actively upon the weeds near the surface of the water, have the smallest number of plants and animals upon them. The Gomphines, which burrow beneath the bottom, have relatively few as compared with the other nymphs which climb about on the weeds near the bottom or crawl over the mud. No parasites were found, but one Libellulid nymph was observed on which a Chironomid larva

had built its case and was feasting on the diatoms about the door of its house. This incident seems to express, perhaps in exaggerated form, the one-sided benefit resulting from the relationship between epiphytes, epizoa and the nymphs. Kammerer ('08), who maintained that the algal growth may bring to the nymph such benefits as a richer supply of oxygen, the keeping aloof of parasites, protection through color, *et cetera*, thinks this relationship is one of symbiosis. The relation seems to me to be a natural one resulting from proximity; because, if the populations living upon the nymphs be compared with those of the mud and water weeds which the nymphs inhabit, they will be found practically the same. The abundance of the population in both cases depends to some extent upon the inactivity of the nymphs.

III. The Food of the Nymphs.

From November 14 to July 10, dragonfly and damsel-fly nymphs were taken from Cascadilla Pond directly to the laboratory, where the contents of their stomachs were mounted in water upon slides and examined under the microscope. If they could not be examined immediately, the heads of the nymphs were removed from the bodies and the alimentary canal gently pulled out, but not severed, so that the contents could be preserved in formalin, and the head and body remain connected for later identification. Eight nymphs contained no fragments of food, but four of these had eaten much sand. The presence of large quantities of diatoms* was puzzling until it was noticed that they appeared during the cold months when Chironomid larvae are the chief source of food, and, in one or two cases, they were seen to be protruding from partially digested larvae. The cases of the Chironomids, on which diatoms grow abundantly, may account for some of the shells and probably the sand present was that of Chironomid cases from which the larvae had been entirely digested. Bits of

*Dr. A. H. Morgan has suggested that some of the diatoms are undoubtedly taken in with the mayflies since they are abundant in the food and epiphytes of mayfly nymphs.

algae were found frequently, but were supposedly taken in by accident. The eggs recorded were thought to be those of a dragonfly.

The large majority of animals eaten were insects, the total number being 95. Five orders were represented, the numbers in each being Ephemerida 8, Hemiptera 11, Diptera 62, Coleoptera 1, Odonata 13. The closely allied groups of Crustacea (13) and Hydrachnida (4) with one snail in addition completed the list. (See page 9.)

EPHEMERIDA.—Four Heptagenias were eaten by four nymphs, *Basiaeschna, Sympetrum, Plathemis* and *Calopteryx,* representing three families of quite different habits. *Hexagenia* was eaten by *Anax junius, Caenis* by *Plathemis,* and two mayflies eaten by *Basiaeschna* and *Calopteryx* were not well enough preserved to be identified.

HEMIPTERA.—This group is represented by the nymph of the waterbug *Corisa,* found the last of April, three of which were eaten by *Leucorhinia intacta,* and one each by *Plathemis, Basiaeschna* and *Calopteryx,* again showing a similar diet in three different families. Two adult waterboatmen were eaten, one each by *Sympetrum* and *Gomphus sordidus* respectively in March.

DIPTERA.—The number of Chironomid larvae far exceeded that of any other animal or group. They constitute the "staff of life" for the nymphs because they are at all seasons abundant and available.* They were eaten by all of the species examined except *Pachydiplax,* which was probably an accidental omission. *Sympetrum,* taken on November 30 with a mayfly and a damsel fly besides 22 Chironomids, most of which were in almost perfect condition, is an example of the appetite and capacity of one of the smaller nymphs. Size seems to have made little difference in the choice of food.

The following species of Chironomids were identified in the food: 1 *Chironomus tenellus* Zetterstedt, 1 *Ch. flavus* Johannsen, 1 *Ch. modestus* Say, 4 *Tanytarsus dissimilis* Johannsen,

*This is especially true in the Winter, when mayflies and the young of their own kind seem to be the only alternatives.

TABLE SHOWING THE CONTENTS OF THE VENTRICULUS OF 36 NYMPHS.

No.	Nymph	Ephemerida	Hemiptera		Diptera		Coleoptera	Odonata	Crustacea	Hydrachnida	Snails	Miscellaneous	Date	Size
			Nymph	Adult	Chironomids	Other larvae								
1	AESHNINAE—Basiaeschna janata	1	....	....	1	....	....	1	....	....	....	Diatoms, Closterium, Scenedesmus caudatus	11-14	.....
2	"	1	....	....	....	....	....	....	....	....	....	Diatoms	11-21	Small
3	"	....	1	....	1	....	....	1	....	....	....		6-18	22 mm.
4	Aeshna	....	....	....	5	....	....	....	1	....	....		6 16	24 mm.
5	Anax junius	....	....	....	5	....	....	....	1	....	....	Sand	3-13	.....
6	"	....	....	....	1	....	....	....	....	....	....		"	Small
7	"	....	....	....	1	....	....	2	2	....	....		4-30	28 mm.
8	"	1	....	....	1	....	1	1	....	....	1	Sand, Closterium, Oedogonium	6-9	37 mm.
9	GOMPHINAE—Gomphus	....	....	....	....	....	....	1	....	....	....	Diatoms	11-30	.....
10	"	....	....	....	1	....	....	....	....	....	....		3-13	Abd. 15 mm.
11	" sordidus	....	....	1	2	....	....	....	....	....	....		"	" 7 mm.
12	"	....	....	....	1	....	....	1	1	....	....	Sand	4-30	28 mm.
13	LIBELLULIDAE—Leucorhinia intacta	....	....	....	....	....	....	....	....	....	....	Sand, many spines	3-13	.....
14	"	....	....	....	....	....	....	....	....	....	....	Sand	"	.....
15	"	....	....	....	....	....	....	....	....	....	....	Sand	"	.....
16	"	....	1	....	2	....	....	1	3	....	....		6-17	15 mm.
17	"	....	1	....	2	2	....	....	1	....	....		6-18	12 mm.
18	"	....	1	....	....	....	....	1	....	....	....	5 eggs	7-10	15 mm.
19	Sympetrum	1	....	....	22	....	....	1	....	....	....		11-30	.....
20	"	....	....	1	1	....	....	....	2	1	....	Sand	3-13	.....
21	"	....	....	....	3	....	....	....	....	....	....		"	.....
22	Plathemis lydia	....	1	....	1	....	....	2	1	1	....		4-30	16 mm.
23	"	2	....	....	....	....	....	....	....	....	....		"	"
24	Pachydiplax longipennis	....	....	....	....	....	1	1	....	....	....		7-10	25 mm.
25	AGRIONIDAE—Calopteryx maculata	1	....	....	....	....	....	....	....	....	....	Diatoms, Closterium	11-21	.....
26	"	....	....	....	2	....	....	....	....	....	....	Diatoms	"	Small
27	"	1	....	....	2	....	....	....	2	2	....		4-30	32 mm.
28	"	....	....	....	1	....	....	....	....	....	....		"	30 mm.
29	"	....	1	....	....	....	....	....	....	....	....		"	30 mm.
30	Chromagrion conditum	....	....	....	1	....	....	....	....	....	....		"	18 mm.
31	Enallagma sp. ?	....	....	....	1	....	....	....	....	....	....		6-16	.....
32	" signatum	....	....	....	1	....	....	....	....	....	....		"	18 mm.
33	" "	....	....	....	1	....	....	....	....	....	....		6-18	"
34	" antennatum	....	....	....	....	....	....	....	1	....	....		6-16	20 mm.
35	" "	....	....	....	3	....	....	....	....	....	....		"	"
	Total	8	6	2	62	2	2	13	14	4	1		11-14 to 7-10	12 to 37 mm.
			8		64									

2 *T. dives* Johannsen, 1 *Cricotopus trifasciatus* Panzer, 1 *Ch. fulviventris* Johannsen, 5 *Ch. riparius* Meigen, 1 *Ch.* sp. 81 Johannsen, 1 *Ch.* sp. 83 Johannsen, 1 *Orthocladius fugax* Johannsen.

Nine belong to the genus *Chironomus*, three to *Tanytarsus* and one to *Orthocladius*. The genus of the remaining number could not be determined.

The only other Diptera were one mosquito larva (*Anopheles maculipennis*) and one unnamed larva.

COLEOPTERA were represented only by two Dytiscid beetles and these eaten in the summer months, June and July.

ODONATA.—A damsel-fly is a delectable bit for a dragonfly and two nymphs of the same size in either group cannot safely be left together unless they are about to transform, when they do not eat. All of those recorded were damsel-flies except one Libellulid and one *Ophiogomphus*. The only damsel-fly which could be determined was *Enallagma hageni*.

CRUSTACEA.—From the middle of March onward, Crustacea are an important item in the food of all families of dragonflies. Considering the abundance of Amphipods in Cascadilla Pond, it is surprising that they are not even more generally used than the records indicate. In the collections made, Amphipoda are represented by five *Hyalella;* Cladocera by two *Diaptomus* and four *Cyclops;* Ostracoda by two *Cypris* and one specimen whose genus was not determined.

HYDRACHNIDA.—*Plathemis* and *Sympetrum* had each eaten the almost uninjured larva of a mite, and *Calopteryx* had devoured two water bears (*Macrobiotus*), which had remained in almost perfect condition.

A *Physa* had been recently eaten by an *Anax* and had remained only partly digested.

From this detailed study it is evident that the nymphs of Odonata are strictly carnivorous, all families feeding voraciously throughout the year upon Chironomid larvae, mayflies and the young of their own order. In the warmer months they eat Crustacea and Hemiptera, at which time these are available, not refusing any other forms which chance to pass within reach of their powerful labium.

IV. Experiments to Determine the Efficiency of Shelter as Protection against Enemies.

Since it is well known that Odonate nymphs have enemies such as fishes, waterbugs and larger nymphs of their own kind, and, since most of them seek shelter in the mud, sand or weeds, the question of the effectiveness of this shelter is a vital one. Vegetation is the universal source of shelter. In the submerged meadows about Ithaca *Elodea, Myriophyllum* and *Potamogeton* are among the typical water weeds, and these were selected for the experiments.

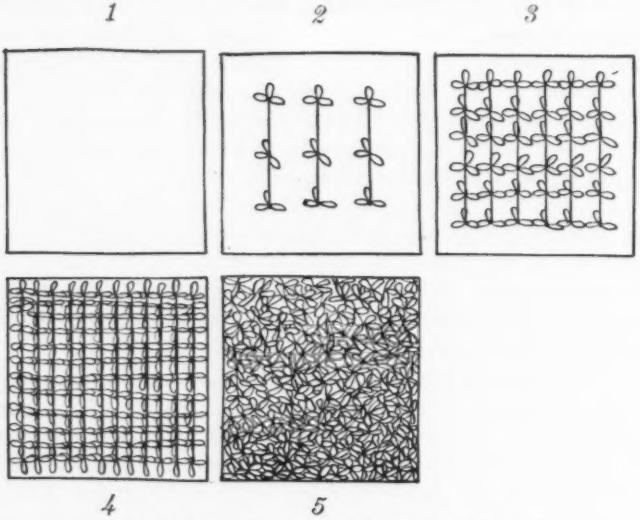
Apparatus (Plate I, Fig. 2).—In order to control the animals in as natural a habitat as possible, a small part of Cascadilla Pond was fenced off with barbed wire, and a bridge of logs and planks built to render this little "pasture" easy of access. Within the enclosure a rough table and stool were set up so that work might be conveniently carried on.

Five cages were marked and placed in the pond with a space between each two equal to the width of a cage. Each one had a zinc bottom ten inches square upon which was soldered a band of galvanized wire gauze, which formed the sides eleven inches in height. The top was left uncovered. Each cage was submerged to a depth of nine inches, thus allowing the sides to project five inches above the water, which was sufficient to prevent the animals within the cage from getting out and those in the pond outside from getting in. Some very small Chironomids, Amphipods, *et cetera,* could get through the wire, but these did not affect the results.

In the first set of experiments the common water weed, *Elodea,* provided shelter. The plants were washed thoroughly and then carefully examined by placing them in water in a white porcelain tray to make sure that no damsel-flies or other animals were in hiding.

Cage 1 was left empty. Three twisted wire bars were placed horizontally and at equal distances from each other in cage 2. To each one of these, three plants were tied, the distance between them being made equal to the expanse of the leaves of the plant. The bars acted as weights, thus holding the

plants in their natural position. Cage 3 contained six bars to each of which six plants were tied with the leaves of adjacent plants in contact. Cage 4 contained twelve bars each with



Diagrams showing Distribution of Vegetation in Cages 1-5.

twelve plants, with one of the whorl of three leaves overlapping that of the next plant. Cage 5 was packed with plants so that no bars were necessary.

In order to make a quantitative measure of the material which afforded the shelter, both plants and wire bars were placed in a graduate partly filled with water. The rise of the water was then noted and the records are given below.

Cage 2, containing 3 bars with 3 plants each, displaced 50 cc. water.

Cage 3, containing 6 bars with 6 plants each, displaced 135 cc. water.

Cage 4, containing 12 bars with 12 plants each, displaced 355 cc. water.

Cage 5, packed with plants, displaced 915 cc. water.

The damsel flies used were *Enallagma* and *Ischnura,* individuals of equal size being selected. Six were placed in each cage with some enemy, such as *Anax* or a Dytiscid larva. The six enemies in the several cages were of nearly equal size. At the end of 36 hours the weeds were examined in a white porcelain tray. The results of the series are given in the following table.

THE EFFICIENCY OF SHELTER

Experiment	Shelter Plant	Enemies	Nymphs Under Observation: No. in each cage at start	No. at time of record, 36 hours later in Cage No. 1	2	3	4	5	Remarks
A_1	Elodea	1 Anax junius. .	6	0	2	2	2(1)	5	(1) 1 transformed.
A_2	"	1 "	6	0	3	3	1	5	
A_3	"	1 "	6	1	1	4	5	4(1)	
B	"	1 Dytiscid larva	6	3(2)	3	4(1)	1(2)	2(1)	
C	"	Horned dace . .	6	0	0	2	2(1)	4	Fish 2½ inch. long, about 1 yr. old.
A_1	Myriophyllum	1 Anax junius. .	6	0	0	4(1)	5	2	Anax in cage 3 died.
B_1	"	1 Dytiscid larva	6	5	5	5	4	5	
B_2	"	1 "	6	4	1	4	5	1	
C	"	Horned dace . .	6	0	0	2	2	6	
A_1	Potamogeton crispus	1 Anax junius. .	6	2	5	2	2(1)	3	
B_1	" "	1 Dytiscid larva	6	4	4	2(2)	3(1)	6	
B_2	" "	1 "	6	5	5(1)	6	6	4	
C	" "	Horned dace . .	6	3	1	2(1)	2(1)	2(1)	

The same method of placing the shelter was followed throughout the series. In the second set of experiments *Myriophyllum* was used because its needle-like leaves offered a different kind of shelter from that of *Elodea.* The arrangement was as follows:

Cage 2, containing 3 bars with 3 plants each, displaced 80 cc. water.

Cage 3, containing 4 bars with 4 plants each, displaced 170 cc. water.

Cage 4, containing 7 bars with 7 plants each, displaced 375 cc. water.

Cage 5, packed, displaced 845 cc. water.

For the third set of experiments, *Potamogeton crispus,* a fairly large plant, with long, broad leaves, was chosen.

Cage 2, containing 2 bars with 2 plants each, displaced 30 cc. water.

Cage 3, containing 3 bars with 3 plants each, displaced 60 cc. water.

Cage 4, containing 5 bars with 5 plants each, displaced 150 cc. water.

Cage 5, packed, displaced 475 cc. water.

From the various combinations of shelter and enemies in the experiments recorded here, the following results were obtained:

1. Dense growths of water weeds but ineffectively protect damsel-fly nymphs from dragonflies. The results were irregular, the shelter at one time efficient, at another inefficient. This might be expected from their similarity in habitat and the custom of the dragonflies to catch their prey as they climb slowly over the weeds.

2. Vegetation of varying density provided a more effective shelter from Dytiscid larvae. There were cases in which the degree of shelter had no influence. Dytiscid larvae are more likely to seek prey at the surface or on the bottom than in midwater. This accounts for irregularities of results here, since even in the empty cage the damsel flies would climb about on the sides of the cage.

3. In every case except cage 2, where the vegetation was very scanty, it was a shelter against fish, the shelter becoming more efficient with increased density. Fish are undoubtedly among the worst enemies of damsel-flies; examination of the contents of fishes' stomachs has repeatedly shown this. The protection afforded by dense aquatic vegetation has then an enormous effect on the economy of the life of damsel-flies.

BIBLIOGRAPHY.

1893 CALVERT, P. P.—Catalogue of the Odonata (Dragonflies) of the vicinity of Philadelphia. Trans. Amer. Ent. Soc. XX, pp. 152-272, 3 pls.

1888 FORBES, S. A.—Studies of the Food of Fresh Water Fishes. Bull. Ill. State Lab. Nat. Hist. Vol. II, Art. vii, pp. 433-473.

1905 JOHANNSEN, O. A.—May Flies and Midges of New York. Aquatic Nematocerous Diptera II. Chironomidae, Bull. N. Y. State Mus. 86, pp. 76-310, pls. 16-26.

1908 KAMMERER, PAUL—Symbiose zwischen Oedogonium undulatum und Wasser jungferlarven. Wiener-Fest-Schr. Wien., pp. 238-252.

1908 LUCAS, W. J.—Foes of Dragonfly Nymphs. The Entomologist, Vol. 41, p. 16.

1901 NEEDHAM, J. G. and HART, C. A.—The Dragonflies (Odonata) of Illinois. Part I. Petaluridae, Aeschnidae and Gomphidae. Bull. Ill. State Lab. Nat. Hist. VI, pp. 1-94.

1901 NEEDHAM, J. G.—Aquatic Insects in the Adirondacks. Odonata Bull. N. Y. State Mus. 47, pp. 429-540, pls. 10, 17-25.

1903 NEEDHAM, J. G.—Aquatic Insects in New York. Zygoptera. Bull. N. Y. State Mus. 68, pp. 218-276, pls. 5, 11-20.

1899 WILLIAMSON, E. B.—The Dragonflies of Indiana. Geol. Surv. Indiana Rept., pp. 229-333, 7 pls.

EXPLANATION OF PLATE I.

Fig. 1. A view of Cascadilla Creek. Collecting grounds in the foreground. Photo by Anna H. Morgan.

Fig. 2. Cascadilla Pond enclosure with nets and cages used in experiments. The weeds and algal mats characteristic of the pond are shown in the foreground.

Fig. 3. Median gill plate of nymph of *Enallagma ebrium* Hagen.

A New Pieris from Cuba (Lepidoptera).

By CHARLES T. RAMSDEN, Guantanamo, Cuba.

Pieris menciae n. sp.

Male: Expanse (one wing) 32 mm. Female: Expanse (one wing) 29.5 mm.

♂. Primaries white, with the faintest tinge of yellowish glaucous (Ridgway). The outer half of the costal edge and the upper half of the outer margin, faintly edged with black. The central veins of the primaries are overlaid with chalk-white scales, in the form of streaks or bands 2.5 mm. wide; they do not reach the outer margin.

Secondaries of the same color as the primaries, with the chalky-white scales confined mostly to the disk.

Underside. Primaries as above, except that the costal edge and the tips of the wings are ivory-yellow or massicot-yellow (Ridgway). Secondaries immaculate and massicot-yellow.

Thorax and abdomen white; the legs the color of the underside of the secondaries. Antennæ black above with the extreme of the club sulphur-yellow.

♀. Like the male except that it is a few shades darker in color and lacks the chalky scales of the male, these being a secondary sexual character.

Male type and allotype in the collection of the Academy of Natural Sciences of Philadelphia. Paratypes in the collection of the author. Specimens were taken June 10 and 26, 1914.

Habitat.—West and southwest of Guantanamo, Cuba.

The species was not uncommon about Guantanamo City and it seems strange that Gundlach, who worked this district over very critically, did not find it. I have never seen it in the higher altitudes. I have taken it from April 14 (earliest) to September 18 (latest record), but it is most abundant during late summer. I have dedicated this species to my wife, who has accompanied me in my collecting trips. I compared this species at the British Museum, through the kindness of Messrs. Richard South and N. D. Riley, where I found something very close to it from Venezuela, which was still unnamed. If this should happen to be the Venezuelan form, it could be accounted for as having been brought over in the chrysalis; it might have emerged while the ship was unloading in port, and finding congenial surroundings and food plant, the species established itself firmly about Guantanamo. This could have happened at the end of the Spanish-American war, when many ship-loads of cattle were brought from Venezuela and Colombia to Guantanamo, and this may also account for the fact that Gundlach did not see the species.

The Cimex on American Bats (Hemip., Heter.).

In reference to Mr. John T. Zimmer's remarks in ENTOMOLOGICAL NEWS for November last, page 418, his note reveals what I have suspected—that according to the then state of our knowledge, a certain bug on a bat was determined as *Cimex pipistrelli* Jen. Horvath (Ann. Mus. Nat. Hung. X, pp. 257-262) cites the species found on American bats, which he had described in *Ent. Mo. Mag.* (2) XXI: 12, fig., in 1910, under the name *Cimex pilosellus*, giving *Vesperugo noctivagus* as one of the hosts. This is in all likelihood the species Mr. Zimmer has reference to.

I shall later refer to the other forms mentioned in my previous note.—J. R. DE LA TORRE BUENO.

Descriptions of three new species of the Dipterous genus Sciapus with a key to the North American species.

By M. C. Van Duzee, Buffalo, New York.

In working out the following table of species, I have used Prof. J. M. Aldrich's key, published September, 1904, in the Transactions of the American Entomological Society, as a basis, but uniting under *Sciapus* the genera *Psilopdinus* and *Agonosoma* there used, as is done by most of the European authors now. This key places eighteen species not contained in that of Prof. Aldrich. Four of these were described by Mr. Coquillett, five by Mr. Bigot and nine by myself. Of these last, three are described in this paper, as follows: *noveboracensis, banksii,* and *bradleii;* three in the Canadian Entomologist, *chalybeus, digitatus,* and *nigrimanus;* and three, *furcatus, leonardi,* and *pollinosus,* will be more fully described in my report of the Dolichopodidae of Okefenoke Swamp, Georgia.

Five species in this key described by Mr. Bigot seem to be recognizable; at least they seem to be distinct from all other known species from North America, but his *carolinensis* and *pallescens* I could not do anything with. Mr. Bigot does not mention any hairs on the face of his *occidentalis, pampoecilus* and *hirtulus,* so I take it that they have the face bare, as no doubt they have; he also states that *occidentalis* has the arista long, so I place it in the section where the arista is at least two-thirds as long as the body; the long bristles of the thorax and abdomen would indicate that it belonged there. He states that the femora of *hirtulus* are reddish with violet reflections; therefore, I take it that his specimen was somewhat immature and the femora should be blackish with violet or green reflections, as this is sometimes the case with immature specimens with dark femora. For the same reason I have placed his *occidentalis* in the group with blackish femora; he describes them as reddish brown.

Key to the North American Species of Sciapus.

1 Cilia of the tegulæ black or dark brown 2
Cilia of the tegulæ pale 67

2 Femora black, the tips may be yellow 3
Femora yellow or mostly yellow 54
3 Wings with dark markings 4
Wings without dark markings 35
4 Dark markings on the wings consist of two cross-bands connected along the costa, in some immature specimens reduced to an infuscation of the veins 9
Dark markings otherwise 5
5 Wings black except beyond the forking of the fourth vein and the hind margin. (Ariz., Mex., W. I., S. Am.)..*dimidiatus* Loew
Wings mostly hyaline 6
6 Wings with an ill-defined brownish band extending from the costa to the posterior end of the cross-vein. (Mex.)...*infumatus* Ald.
Wings with a cloud along the anterior portion 7
7 Middle tibiæ with rather large bristles on the front surface 8
Middle tibiæ destitute of bristles. (Mex.) .....*ciliipennis* Ald.
8 Middle tibiæ with three long, slender bristles, hind tibiæ without bristles. (Pa.) .....*chalybeus* V. D.
Middle tibiæ with a row of about fourteen bristles, hind tibiæ with a similar row. (Mex., Cent. Am.) .....*cilipes* Ald.
9 Fore tarsi with dense black fringe on the sides of the fourth and fifth joints, middle tarsi with the second and third joints less broadly fringed. (Mex.) .....*bifimbriatus* Ald.
Fore tarsi of different structure 10
10 Fore tibiæ black 11
Fore tibiæ pale, at utmost brownish 14
11 Second antennal joint with many and long bristles 12
Second antennal joint with few and short bristles. (Mex.) *praestans* Ald.
12 Last four joints of fore tarsi subequal 13
These joints of gradually decreasing length. (West U. S., Mex.) *melampus* Loew
13 Face with numerous delicate, pale hairs. (U. S.)..*patibulatus* Say
Face bare. (West U. S.) .....*pilicornis* Ald.
14 Fore tarsi yellow, not or but little infuscated towards the tips..15
Fore tarsi infuscated, part of the first joint may be yellow 17
15 Abdomen with two long, wavy, hair-like bristles on the sides at tip. (Mex., Guatemala.) .....*forcipatus* Ald.
Abdomen without such bristles 16
16 Middle tarsi black, fourth and fifth joints with narrow silvery fringe above. (Mex., Brazil.) .....*diffusus* Wied.
Middle tarsi but little infuscated and with the fourth joint pure white. (W. I., Mex., Brazil.) .....*bellulus* Ald.

17 Knob of the halteres infuscated 18
Knob of the halteres yellow 23
18 Middle and hind tibiæ entirely black 19
At least the middle tibiæ largely yellow 20
19 Middle metatarsi ciliated above. (Cuba.) .....*pilosus* Loew
Middle metatarsi not ciliated. (Mex.) .....*inornatus* Ald.
20 Last four joints of hind tarsi regularly decreasing in length. (W. I., Brazil.) .....*jucundus* Loew
These joints not regularly decreasing, the last two or three being subequal 21
21 Last two joints of hind tarsi subequal and a little swollen. (Mex.) *atricauda* Ald.
Last three joints subequal and a little flattened 22
22 Last three joints of hind tarsi glabrous, middle metatarsi as long as their tibiæ. (Mex., Brazil.) .....*triseriatus* Ald.
Last three joints of hind tarsi hairy, middle metatarsi longer than their tibiæ. (Ga.) .....*leonardi* V. D.
23 Apical third of fore coxæ with trochanters and base of femora yellow. (Mex.) .....*coxalis* Ald.
Not more than the extreme apex of fore coxæ yellow 24
24 Third antennal joint large.....25
Third antennal joint small or of moderate size.....26
25 Second antennal joint with long bristles. (Mex.) .*astequinus* Bigot
Second antennal joint with short bristles. (Mex) .*purpuratus* Ald.
26 Second antennal joint with short bristles.....27
Second antennal joint with long bristles 30
27 Middle tibiæ with a row of bristles on the lower front surface extending the whole length 28
Middle tibiæ with not over four bristles at most in the same longitudinal line 29
28 Fore metatarsi with a row of erect bristles below, second joint without bristles. (Guatemala.) .....*nigrimanus* V. D.
Fore metatarsi with a few bristles near tip, second joint with a row of small bristles below. (Mex.) .....*genualis* Ald.
29 Bristles on the second joint of the antennæ shorter than the diameter of that segment. (Mex.) .....*breviseta* Coq.
Bristles on second joint about as long as the antennæ. (Cuba.) *digitatus* V. D.
30 Middle tibiæ with a row of stout bristles on the outer side, middle metatarsi ciliated. (Mex., Brazil.) .....*triseriatus* Ald.
Middle tibiæ with not over four bristles in a row, middle metatarsi not ciliated 31
31 Last two joints of hind tarsi flattened 32
Last joints of hind tarsi not flattened 33

32 Hind tibiæ bearing a single bristle. (Mex.) .....*longiseta* Coq.
Hind tibiæ with scattered bristles. (Mex.) .....*depressus* Ald.
33 Hypopygium and its appendages very small, the latter finger-like. (Mex.) .....*similis* Ald.
Hypopygium and its appendages large 34
34 Hypopygial lamellæ large, flat, with an excavation at tip and short, curling, dark hair on the inner surfaces. (Mex.) *atrolamellatus* Ald.
Lamellæ broad, nude, each composed of two flattened plates, the outer attached to the inner near the base. (Mex.)..*clunalis* Coq.
35 Face with abundant slender hairs 36
Face bare 41
36 Face with dark hairs. (Mex.) .....*barbatus* Ald.
Face with pale hairs 37
37 Middle metatarsi with a row of crooked bristles below 38
Middle metatarsi normal 39
38 Tip of abdomen with a tuft of long hairs, the longest being nearly as long as the last four segments of the abdomen. (U. S., W. I., Mex., S. Am.) .....*caudatus* Wied.
Longest hairs at the tip of the abdomen not much longer than the last segment. (U. S.) .....*scobinator* Loew
39 Middle tibiæ with a strikingly long apical spur. (U. S.) *calcaratus* Loew
Spur of middle tibiæ rather short 40
40 Last four joints of fore tarsi of regularly decreasing length. (U. S.) .....*inermis* Loew
Last four joints of fore tarsi short, second and third subequal, fourth as long as the two preceding. (U. S.) ...*patibulatus* Say
41 Arista at least two-thirds as long as the entire body 42
Arista much shorter 45
42 Fore metatarsi with long cilia above 44
Fore metatarsi without long cilia 43
43 Arista ending in a small disk. (Mex.) .....*nobilissimus* Ald.
Arista plain. (Calif.) .....*occidentalis* Bigot
44 Hypopygial appendages pale, middle metatarsi ciliated. (U. S.) *comatus* Loew
Hypopygial appendages blackish, middle metatarsi plain. (U. S.) *crinitus* Ald.
45 Thoracic dorsum covered with thin white pollen, front densely silvery pollinose 46
Thorax and front mostly shining 47
46 Legs wholly black, fore tibiæ with three or four bristles in a row. (Mex.) .....*argentatus* Ald.
Fore and middle femora and base of fore tarsi yellow, fore and middle tibiæ each with two long bristles. (Fla.).*pruinosus* Coq.

47 Costa with erect cilia 48
Costa without erect cilia 49
48 Second joint of fore tarsi shorter than any of the following joints. (U. S.) .....*mundus* Wied.
Second joint longer than any following. (Mex.) ....*hirtipes* Ald.
49 Middle metatarsi with erect cilia above. (Mex.) .....*ciliipes* Ald.
Middle metatarsi not so ciliated 50
50 Middle tibiæ black 51
Middle tibiæ yellow 52
51 All tibiæ black, fore tarsi with second and third joints subequal, fourth and fifth longer but also subequal. (Western States.) *pilicornis* Ald.
Fore tibiæ yellow, last four joints of fore tarsi regularly decreasing in length. (U. S., W. I.) .....*chrysoprasius* Walk.
52 Hypopygium large, its appendages large, curved, forceps-like; abdomen with two long wavy bristles at tip. (Mex.) *forcipatus* Ald.
Hypopygium small or only moderately large, abdomen without long bristles at tip 53
53 Hind tibiæ and halteres yellow. (Hayti.) .....*hirtulus* Bigot
Hind tibiæ and halteres infuscated. (Mex.) .....*purpureus* Ald.
54 Wings with dark markings 55
Wings wholly hyaline 63
55 Antennæ yellow. (Mex., Brazil.) .....*basilaris* Wied.
Antennæ black 56
56 Hyaline space between the cross-bands reaching forward to the second vein 57
Hyaline space not reaching beyond the third vein 59
57 First joint of the fore tarsi white at tip, the following joints black, fourth fringed with black hair above. (Mex.) ..*interceptus* Ald.
Fore tarsi plain, gradually infuscated 58
58 Fore coxæ black. (Mex.) .....*pennifer* Ald.
Fore coxæ yellow. (Mex.) .....*flavicoxa* Ald.
59 Second and third joints of fore tarsi stout, swollen, bristly. (Mex.) *clavipes* Ald.
Fore tarsi plain or only bristly 60
60 Fore coxæ green. (La.) .....*viridicoxa* Ald.
Fore coxæ pale 61
61 Middle metatarsi with a row of erect cilia on the front surface. (U. S.) .....*scaber* Loew
Middle metatarsi plain 62
62 Middle tibiæ with a row of bristles on the front surface. (U. S.) *sipho* Say
Middle tibiæ with only scattered bristles. (Ga., Fla.) .*furcatus* V. D.

63 Face with numerous pale hairs 64
Face bare 65
64 Fifth joint of all the tarsi black, fifth joint of hind tarsi cylindrical. (U. S.) .....*flavipes* Ald.
Fifth joint of fore and middle tarsi whitish, last joint of hind tarsi a little flattened and orbicular in outline. (N. Y., Va.) *banksii* Ald.
65 Middle metatarsi greatly elongated, ciliated. (W. I.) *insularis* Ald.
Middle metatarsi plain 66
66 Face and front green, antennæ black, fore femora entirely yellow. (Mex.) .....*tonsus* Ald.
Face and front violet, antennæ reddish brown, arista long, fore femora blackened at base. (Hayti.) .....*pampoecilus* Bigot
67 Antennæ entirely black 68
Antennæ yellow, at least at base 71
68 Coxæ and base of femora black. (Hayti.) .....*polycroma* Bigot
Femora and fore coxæ wholly yellow 69
69 Coxæ yellow, middle pair blackened at base, costa with a notch before the tip of the second vein. (Ga., Fla.) .....*costalis* Ald.
Fore coxæ yellow, middle and hind coxæ black, costa without a notch 70
70 Very bright and shining, hypopygium large with black appendages. (U. S.) .....*scintillans* Loew
Dulled with grayish pollen, hypopygium small with the appendages partly yellow. (Ga.) .....*pollinosus* V. D.
71 Dorsum of the thorax yellow with a green or blue stripe 72
Dorsum wholly metallic 73
72 Pleuræ yellow, middle tibiæ and metatarsi with erect cilia. (W. I.) *flavidus* Ald.
Pleuræ with an indistinct dark spot, tarsi plain. (W. I.) *dorsalis* Loew
73 Thoracic dorsum opaque, pollinose. (East U. S.)...*pallens* Loew
Thoracic dorsum shining 74
74 Middle coxæ infuscated on the outer side for at least half their length 75
Middle coxæ wholly or almost wholly yellow 80
75 Costa of the male with erect cilia 76
Costa of the male without such cilia 77
76 Costa with an angular projection near the tip. (Southern States.) *psittacinus* Loew
Wing of the male flattened in outline at apex but the front corner rounded. (Ga.) .....*bradleii* n. sp.

77 Middle femora of male shortened, dark at base, their tibiæ and tarsi very much elongated 78
Middle femora normal 79
78 Middle tarsi with the last three joints much flattened. (N. Y.) *noveboracensis* n. sp.
Middle tarsi plain. (Eastern States.) .....*filipes* Loew
79 Abdomen yellow at base above, thorax coppery or golden on the sides of the dorsum. (East U. S., W. I.) .....*variegatus* Loew
Abdomen not pale at base, thorax green, more bluish-green along the front. (Cuba).....*castus* Loew
80 Fore femora with slender erect bristles below. (U. S.) *tener* Loew
Fore femora without such bristles 81
81 Hind margin of the pleuræ yellow 82
Hind margin of the pleuræ green. (Mex.) .....*mexicanus* Ald.
82 Abdomen with basal yellow band, remainder green. (U. S.) *unifasciatus* Say
Abdomen with the greater part of the first four segments yellow. (U. S.) .....*rotundiceps* Ald.

Sciapus dimidiatus Loew.

I have seen seven males of this species from Arizona. The tibiæ were more brown than yellow, especially the hind ones; the hyaline tip to the wing is not over one-third the length of the wing, reaching just to the forking of the fourth vein (Fig. 1); the tegulae are entirely black, instead of being bordered with black, as Loew states; the outer appendages of the hypopygium are pointed lamellae, and are of a blackish color with rather long hairs on the inner edges. These differences are probably only individual.

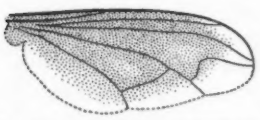


Fig. 1.—Wing of *Sciapus dimidiatus* Loew.

Sciapus banksii n. sp.

Face with white hairs; antennæ, cilia of the tegulæ and middle and hind coxæ black; fore coxæ and all the legs yellow; fifth joint of fore and middle tarsi white; wings hyaline. Length 4 mm.

♂. Face and front metallic green with yellowish brown pollen which does not conceal the ground color; face with slender white hairs; antennæ black; arista about two-thirds as long as the width of the head.

Thorax and abdomen metallic green, in some individuals more blue green, except the posterior half of the abdomen, which is golden green;

hypopygium very small with concealed appendages; incisures of the abdomen narrowly black; bristles of the thorax of moderate length, those of the abdomen short; pleuræ greenish black.

Fore coxæ yellow; middle and hind coxæ black; trochanters, femora, tibiæ and tarsi yellow; fore and middle tarsi a little darker towards the tips and with the fifth joints white; hind tarsi blackened from the tip of the first joint, about three-fourths as long as their tibiæ, first joint nearly as long as the remaining four joints together, fourth shorter than the fifth, about as broad as long, fifth a little flattened, nearly orbicular in outline, deep black; middle and hind tibiæ with a small bristle on the basal third; hind tibiæ and tarsi with rather long hairs.

Halteres yellow; tegulæ brown with black cilia.

Wings hyaline, only slightly tinged with gray; venation as in *S. flavipes* Ald.

♀. Two females taken with the males described above have the face more blackish; fifth joint of fore and middle tarsi are not white; hind tarsi normal; the abdomen more golden green than in the male.

Described from three males and two females taken by Mr. Nathan Banks, at Falls Church, Virginia, July 4th and 6th. He took one male at Sea Cliff, Long Island, New York. Type in the collection of Mr. Nathan Banks.

This interesting little species, which I dedicate to its captor, could easily be mistaken for *S. flavipes* Ald. which it resembles in size and color, but in that species the fifth joint of all the tarsi is black, while in this species the fore and middle tarsi have the fifth joint white, contrasting with the darker joints which precede them; the hind tarsi do not have the fifth joint flattened as in this species. I think it would be difficult to separate the females of the two species.

Sciapus bradleii n. sp.

First two joints of the antennæ yellow; abdomen with yellow at base; wings with the apex flattened in outline and with the front apical corner rounded; costa with erect cilia. Length 4.5 mm.

♂. Face and front metallic green, the former thickly covered with white pollen; palpi, proboscis and two basal joints of the antennæ yellow, the third joint of the antennæ small, rounded, brown; arista about as long as the width of the head.

Thorax dark metallic green, with grayish pollen; pleuræ more blackish green with white pollen; scutellum blue green with two strong bristles inserted widely apart.

Abdomen paler green and dull with pollen, the venter and some of the incisures yellow, first segment largely yellow, last three segments with coppery reflections; hypopygium small, mostly concealed, with the rather long outer appendages yellow.

Legs and coxæ pale yellow; middle coxæ blackish on the outer surface for half their length; middle femora with one slender black bristle near the tip on the hind edge, and a few black hairs on the upper hind edge towards the tip; middle femora, tibiæ and metatarsi of about equal length; middle tibiæ with a slender bristle close to the tip, this bristle fully twice as long as the diameter of the tibiæ; middle tibiæ and metatarsi with long hair; hind tarsi as long as their tibiæ and black from the extreme tip of the first joint.

Cilia of the tegulæ white.

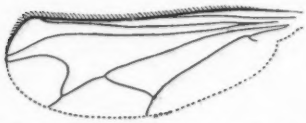


Fig. 2.—Wing of *Sciapus bradleii* n. sp.

Wings with the front apical corner rounded, the second vein entering the costa before this rounding begins, second vein running close to the costa and parallel with it for some distance before entering it; costa with erect cilia which are longest at the tip of the second vein, rapidly decreasing in length beyond this point. (Fig. 2.)

Described from one male from St. Simon Island, Georgia, taken about the first of May, by Dr. J. C. Bradley. Type in the Cornell University collection.

Sciapus noveboracensis n. sp.

Two basal joints of the antennæ yellow; hypopygium large with long appendages; femora mostly yellow; middle tibiæ extraordinarily long and slender; middle tarsi flattened and contorted; cilia of the tegulæ white. Length 6 mm.

♂. Face and front metallic green with yellow pollen, the pollen more whitish on the lower part of the face; antennæ short, the two basal joints yellow, third joint black; arista black, inserted near the base of the third joint, hardly as long as the width of the head.

Dorsum of the thorax dark metallic greenish blue with thin yellowish pollen; pleuræ green with white pollen; bristles of the thorax rather long.

Abdomen metallic green, thinly covered with yellowish pollen, and with black incisures, with a few long yellow hairs at base above, and with about six black bristles near the hind margin of the segments; hairs on the venter rather long and white; hypopygium large, black, with long appendages which are yellow towards their tips.

Middle and hind coxæ black. Fore coxæ yellow with long white

hairs on the front surface; fore femora short, pale yellow, with a few long pale bristles below near the base; fore tibiæ yellow, longer than their femora, short-haired; fore tarsi long and slender, blackened almost from the base, the metatarsi one and one-fourth times as long as their tibiæ, remaining joints taken together only about one-third as long as the first. Middle legs extremely slender (fig. 3), femora rather short, of normal size at base but tapering rapidly so as to be very slender in the middle, the knee large and contorted; middle femora black at base, pale yellow from before the middle; middle tibiæ extremely long and slender, over 5 mm. long, wire-like, black except extreme base, glabrous; middle metatarsi still more slender, two-thirds as long as their tibiæ with a row of short spines below towards the tip, black; second joint black, slender but short, with long hairs above; third joint short, flattened, widened at tip, fringed with long hairs on one edge; fourth joint short, flattened, wider than the third, bent or twisted, with only a few short hairs; fifth joint short, yellow at base and black at tip, bent, not so greatly flattened as the two preceding joints; third and fourth joints yellow. Hind femora yellow, long and slender with a few long yellow hairs above at base; hind tibiæ a little longer than their femora; hind tarsi shorter than the hind femora, black from before the middle of the first joint, first joint longer than the remaining four together, somewhat thickened in the middle.

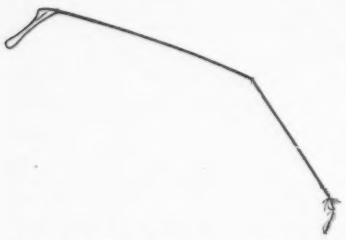


Fig. 3.—Middle leg of *Sciapus noveboracensis* n. sp.

Halteres yellowish; tegulæ pale yellow with a narrow black tip and with long white cilia.

Wings grayish hyaline, long and rather narrow.

♀. Length 4 mm. Differs from the male in having the pollen of the face silvery white; thorax and abdomen covered with an equally thick coat of coarse yellowish pollen; all legs normal; all tarsi blackened from the base of the second joint.

Described from one male and one female, taken at Gowanda, New York, June 8th. Type in the author's collection.

This belongs to the same group of species as *S. tener* and *filipes* of Loew, the middle legs of which are slender; the hypopygium is formed about alike in all three species and the wings are also very much alike.

The Longevity and Mating Habits of Dichromorpha viridis Scud. (Orth.).

By Phil Rau, St. Louis, Missouri.

During July and August, 1909, I had an opportunity to record the adult longevity and the mating habits of this Orthopteran species.*

The adult hoppers, nineteen males and six females, were taken in my garden and confined in lamp-chimney breeders containing growing grass. The table shows that the females lived from 23 to 34 days (with one exception), while the males lived only from one to ten days, most of them living 3 or 4

Table I.

SEX	LENGTH OF LIFE IN DAYS	NO. OF INDIVIDUALS
♀	34	1
♀	33	1
♀	29	1
♀	28	1
♀	23	1
♀	4	1
♂	1	3
♂	2	2
♂	3	5
♂	4	5
♂	6	1
♂	7	1
♂	8	1
♂	10	1

days. How old the insects were when captured is unknown, but since they were all taken within a few days, it is probable that all were of approximately the same age. Thus we see the significant difference in the length of life of the sexes. The short life of the males may be due to the conditions of confinement affecting the male and not the female, but it is more likely that the males are naturally short-lived since none were observed to take food; the females, however, were heavy feeders, often eating while in copulation. There was nothing in

*Mr. A. N. Caudell kindly identified this insect.

the behavior of the males to indicate senescence due to old age. They always seemed active and mated readily, even remaining in copulo, in a number of instances, up to just a few hours before their death.

In the cages these insects were polygamous and polyandrous, a male mating many times with the same or other females, and a female mating often with one or many males.

TABLE II.

♀ No.	NO. OF TIMES IN COPULA	NO. OF MALES MATED	LENGTH OF EACH COITION IN HOURS	TOTAL TIME IN HOURS SPENT IN COPULA
1	3	2	7, 10, 6½	23½
2	6	2	8, 5, 26½, 15, 6, 12	72½
3	8	3	4, 8, 7, 15, 3, 30½, 7½, 9½	84½
4	7	3	10, 1, 13, 4½, 5, 8, 12	53½
5	5	2	11, 34, 6, 6, 12	69
6	6	1	25, 6, 6	37

Table II shows that these females during their lives mated from 3 to 8 times with from 1 to 3 males which were virgin or had already fertilized other females; that the duration of each coition varied from 1 to 34 hours; and that the total number of hours spent in mating by each female varied from 23½ hours to 84½ hours. In fact, the females mated whenever a male was available. In only one instance was an attempt made to oviposit. In this case the female spent several hours with her ovipositor buried in the earth, but an examination later showed that no eggs were deposited.

Corrections to Paper on Andean Muscoidea (Dipt.).

Mr. Walton has called my attention to two errors which have crept into my paper published in Pr. U. S. N. M., Vol. 43 (1912). They are:

Page 309, *Oestrogaster*, third line, should read "well developed palpi" instead of "no palpi." The palpi were both so closely appressed to the folds of the proboscis that they entirely escaped my observation at time of making description.

Page 333, *Dejeania andina*, sixth line, should read "Differs in having no black whatever on legs" instead of "no yellow whatever." This was a clerical error, as shown in context.—CHARLES H. T. TOWNSEND, Bureau of Entomology, U. S. Dept. Agric., Washington, D. C.

A Second Bromeliad-Inhabiting Crane-fly (Tipulidae, Diptera).

By CHARLES P. ALEXANDER, Ithaca, New York.*

In ENTOMOLOGICAL NEWS for November, 1912, the author described, as *Mongoma bromeliadicola*, a Costa Rican crane-fly that had been bred by Mr. Picado from larvae dwelling in the water of bromeliaceous plants. Since that article was written, specimens of a second species, allied to *M. bromeliadicola*, have been received from the U. S. National Museum through the kindness of Mr. Frederick Knab, and this species is characterized in this article.

Mongoma leucoxena sp. n.

Cross-vein *r* just before the fork of *R*2 plus 3; wings subhyaline with the tip a little darkened; legs black with the tip of the femur and the base and tip of the tibia white; all the tarsi white.

Male.—Length, about 9.8 mm.; wing, 8 mm.

Female.—Length, 10.4 mm.; wing, 8.8 mm. Fore leg, femur, 11.3 mm.; tibia, 12.3 mm.; tarsus, 10 mm. Middle leg, femur, 12 mm.; tibia, 11.3 mm.; tarsus, 8.9 mm. Hind leg, femur, 12 mm.; tibia, 11.4 mm.; tarsus, 7.7 mm.

Rostrum and palpi brownish black. Antennae rather long, dark brown; the flagellar segments elongate oval. Head light fawn yellow with an elongate dark brown mark on either side of the vertex.

Thoracic praescutum yellowish brown with three reddish brown stripes, the median one narrower, darkest behind, indistinct in front; lateral stripes indistinct. Scutum with the lobes reddish brown, the median space paler. Scutellum and postnotum reddish brown. Pleurae dull yellow, more reddish on the dorsal mesopleurites before the wing root.

Halteres rather short, dark brown, pale at the base.

Legs, fore pair, coxae and trochanters dull yellow, femora brownish black with the tip broadly white, tibia with a white basal annulus subequal in width to the femoral ring, apical third of the tibia white, remainder dark brown, tarsi white, claws brown; middle and hind legs similar but the white tibial apex rather narrower including about two-sevenths of the segment.

Wing subhyaline or nearly so, iridescent, the tip slightly darkened; stigma rounded dark brown; veins dark brown. Venation: Cross-

*Contribution from the Entomological Department of Cornell University.

vein *r* slightly before the fork of *R2* plus 3, the distance about equal to one-quarter of the cross-vein *r*.

Abdominal tergites dark brown, the lateral margins rather bright yellow; ovipositor reddish chestnut; sternites yellow.

Holotype, ♀, Cordoba, Mexico. Larva in the water of bromeliads; adult issued April 20, 1908. (Frederick Knab.)

Allotype, ♂, Topotypic; adult issued May 5, 1908.

Type in the U. S. National Museum; allotype in the author's collection.

Since *Mongoma bromeliadicola* was first described, Mr. Picado's excellent work on the fauna of the bromeliaceous epiphytes has appeared and in this paper the author has given a plate and figures of the larva and pupa of this insect.† *M. leucoxena* differs from all the known forms with pale knees in its uniformly white tarsi.

The Real Trigona dorsalis Smith Rediscovered (Hym.).

By T. D. A. Cockerell, Boulder, Colorado.

Mr. Frederick M. Gaige, of the University of Michigan, sends me three workers of *Trigona* which he collected recently in Colombia, when a member of the Bryant Walker Expedition. The following data concerning them are taken from his note book:

"Cincinnati Coffee Plantation (20 miles inland from the port of Santa Marta). July 12, 1914. Altitude, 5,000 feet. Stingless bees; found colony in deep forest, situated at foot of huge buttressed tree; had cylindrical tunnel of wax cemented on side of one buttress, with end free from the bark, ¾ inch in diameter, opening rather more than ¼ inch. This is entrance to nest, 20 inches long, leading to ground in gradual curve. Several bees about the opening, both entering and

† Les Bromeliacees Epiphytes. C. Picado. Bull. Scient. de la France et de la Belgique; 7th series, vol. 47, fasc. 3, pp. 356, 357, pl. 13, figs. 1, 2, 4.

coming out. Could not open nest. Bees not easily disturbed." (No. 124.)

Upon examination, the species appeared to be new. It was seen to be closely allied to *T. ziegleri mayarum* Ckll., from Guatemala, but that insect has clear (suffusedly yellowish) wings, a larger mesothorax, and is much less densely pubescent. It was also close to a specimen labelled "*T. dorsalis* Sm.," from Smith's collection, but that has yellow bands along the inner orbits to the summit, less pubescent front, differently colored wings, etc.

Unfortunately, however, confusion has arisen concerning the application of the name *T. dorsalis* Smith. Friese has applied it to *T. pectoralis* D. T., which agrees neither with Smith's description nor with my Smithian specimen. Two descriptions of *T. dorsalis* by Smith are extant; the first published (Cat. Hym. Brit. Mus.) in 1854; the second (Trans. Ent. Soc., Lond.) in 1863. Upon comparison, discrepancies appear. Thus, in 1854, it is said that the wings are testaceous, in 1863 that they are hyaline. My supposed co-type, one of Smith's own specimens, is the insect of 1863, but what of the *dorsalis* of 1854 from Pará; could it be the insect found by Mr. Gaige? The description certainly suggested such a possibility. At this point I forwarded my description to Mr. G. Meade-Waldo, of the British Museum, with a statement of my perplexity. He now kindly replies that he finds in the Museum two distinct species under *dorsalis,* one the original insect of 1854, the other that of 1863, bearing, like my Smithian specimen, the number 18. My description of Mr. Gaige's insect fits the true *dorsalis* "admirably," and is "without any doubt" that species. I give this description herewith, as Smith's account is too brief.

Trigona dorsalis Smith.

Length nearly 7 mm.; abdomen long and comparatively narrow; head broad, black, with the clypeus, triangular supraclypeal mark, triangular lateral marks (filling space between clypeus and eye, and sending a slight linear process upwards along orbit), labrum and mandibles chrome yellow; mandibles with a broad simple outer cutting edge,

and two sharp teeth on the inner side, near the inner angle (the innermost representing that angle); malar space linear in front, broadened behind; front and face with fine fulvous tomentum, not concealing surface, but giving it a strong yellowish cast; vertex with denser and longer hair; cheeks covered with a dense fulvous felt, wholly hiding surface; thorax, except middle of metathorax, closely beset with fulvous hair, so that the color of the tegument is much obscured; mesothorax black with the lateral margins narrowly yellow; scutellum yellow; sides of thorax fulvous yellow, with a more or less distinct vertical dusky band on pleura; middle of metathorax broadly black, sides fulvous yellow; scape yellow, with a black stripe on upper end above; flagellum black above, testaceous beneath; legs clear fulvous, the broadly expanded apical half of hind tibiæ black, the black surface invaded on inner side by a broad band of very short fulvous tomentum, the tibial margins with long black and fulvous hairs; hind basitarsi black on outer side, on inner side densely covered with fulvous hair; tegulæ fulvous; wings bright orange fulvous, only slightly translucent; abdomen clear fulvous, yellower beneath.

I fail to find a name applicable to the *T. dorsalis* of 1863, so it may be called

Trigona meade-waldoi n. n.

Notes on Trichogrammatidae (Hymen.).

1. *Trichogramma minutum* Riley. The following new host and localities: *Olene pinicola* Dyar at Greenwood and North Saugus, Massachusetts, and Wascott, Wisconsin. Data from P. H. Timberlake. The Wisconsin record was made by Mr. N. A. Thomson. Specimens identified by myself. Through the Bureau of Entomology at Washington.

2. *Oligosita sanguinea* (Girault). One male, two females reared by Mr. Timberlake at Salt Lake City, Utah, June 7, 1913, from cold storage material accompanying cocoons of *Phytonomus posticus*, collected at Portici, Italy, by Mr. Thomson about the middle of May, 1913. The material consisted mostly of leaves and stems of alfalfa. The species is very common in North America, which is probably its native home. I would suggest as being most probable, that it had been introduced into Europe in connection with commerce in grasses. It has not been known previously from Europe, but this may be due to the fact that collections in this family are fragmentary there.

In this connection it should be noticed that the wings of the yellow male were perfect but narrower and shorter than those of the female. —A. A. Girault, Nelson (Cairns), Queensland, Australia.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JANUARY, 1915.

Hints on Packing Insects for Transportation.

Dried insects are exceedingly delicate and will not stand any sudden jarring or the least knock, especially when pinned. Such material has so often been received here at the Academy of Natural Sciences in broken condition on account of improper packing, that a few words on this subject will be appropriate. NEVER SEND PINNED SPECIMENS IN A SINGLE BOX WITHOUT SURROUNDING THE BOX WITH SOME SPRINGY MATERIAL, such as dry sea grass, excelsior, or cotton. The box should be light and strong with the lid so made that it will not crush in. The pins bearing the specimens should be firmly pushed in the cork, which should be securely fastened or glued to the bottom or sides of the box. The box should then be wrapped in soft paper to exclude any dust that may arise from the packing. The packing should be loosely wrapped around the box, say an inch or more in thickness, and held intact by placing the whole in another box or by wrapping it in heavy paper and securely tying with strong string. DON'T pack the springy material so tightly that it is useless as a preventive of jarring. Give attention to the corners and DON'T let them come in contact with the container, be it box or paper. A chip basket with handle makes a good container when a large box is sent by express. It is a good plan to place a layer of raw cotton over the cork, but never over the specimens. Heavy specimens that are liable to swing on their pins should be braced by a stout pin against each edge of the abdomen. Always remember if one specimen becomes loose it ruins many, and that "one fine, faultless specimen is worth no end of trash."—E. T. C., JR.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Change of Address.

E. P. Van Duzee *to* University of California, Dept. of Entomology, Berkeley, Cal.

Notes on the Siricidae of California (Hym.).

1. *Sirex apicalis* male of *areolatus.*

In October of 1907 I collected at Messa Grande, Sonoma County, California, five Siricids (two males and three females) that were flying about together. The females had also been seen depositing their eggs in some freshly cut redwood logs.

Dr. E. C. Van Dyke tells me this latter observation is of some economic importance, the species of the Siricid that bores into redwoods having been previously unknown. This insect is the most common of the few that bore into the heartwood of the tree.

Though not found in the act of copulation, the flight of these insects together makes me believe they are male and female of a single species. Both sexes are common about the San Francisco bay region, specimens in the California Academy of Science and in my own collection having been taken from San Mateo, San Francisco and Alameda Counties.

Using Dr. J. C. Bradley's paper, "The Siricidae of North America" (Reprint Jr. Ent. & Zool. Pomona College, Claremont, California, April, 1913), the females fit the description given for *Sirex areolatus,* race *areolatus* (Cresson) Kirby. The male, however, runs down to *Sirex apicalis* Kirby.

Konow has already considered *apicalis* to be a synonym of *areolatus* and has described a male and female from Vancouver as *Paururus areolatus.* On the other hand, Bradley believes his new species *Sirex obesus* to be the female of *apicalis.* This is apparently very improbable, as I have compared a female of this species and find it very different from the female of "apicalis."

We can therefore assume for the present that *Sirex apicalis* is the male of *areolatus* and that the name for this species should be *Sirex areolatus* (Cresson) Kirby.

2. New Localities.

Urocerus albicornis (Fab.) Harris, taken July, 1912, as far south as Castella, Cal.

Sirex obesus Bradley, taken August, 1906, as far west as Nevada City, Cal.

Sirex apicalis Kirby, as far south as San Mateo County, Cal.—J. P. Baumberger, Bussey Institution, Forest Hills, Boston, Mass.

Identification of Specimens.

For the mutual benefit of the collector or amateur entomologist, and the specialist who desires to examine all the material possible in the groups in which he is interested, the NEWS reserves space for listing those who are willing to determine such material. The collectors must bear in mind that the material must be in first class condition accompanied with full data as to date and location of capture; must be pinned (excepting Coccidae and other minute insects which require special treatment) and properly packed. Specimens not in such condition will be returned at the expense of the sender. Hints in packing insects for transportation may be found in this number, page 33. The transportation to the specialist must be prepaid. The specialist is to have the privilege of retaining the first set of any species he may desire.

Any specialist not listed but willing to make determinations, and any of those listed below who no longer care to do such work, please advise the editor of this journal.

The following specialists will determine material in their respective groups, from North America, unless otherwise noted. Those names preceded by (*) should be communicated with before sending specimens, as their time for such work is limited, or they are interested only in special groups or genera.

DIPTERA.—*Chironomidae* and *Mycetophilidae*: O. A. Johannsen, Cornell Univ., Ithaca, N. Y.; *Empididae*: A. L. Melander, Pullman, Wash.; *Syrphidae*: A. L. Lovett, Corvallis, Oreg.; *Acalyptratae*, especially *Ephydridae*: E. T. Cresson, Jr., Acad. Nat. Sci., 1900 Race St., Phila., Pa.

HEMIPTERA.—*Jassidae*: E. D. Ball, Logan, Utah; *Aphididae* (material in this family should be provided with complete data on food plants, correct scientific names of same, date and location of capture): C. P. Gillette, Fort Collins, Col., H. F. Wilson, Corvallis, Ore., Edith M. Patch, Orono, Me.; *Psyllidae* (see note under Aphididae): Edith M. Patch, Orono, Me.; *Aleyrodidae*: J. R. Watson, Gainesville, Fla.; *Coccidae*: *J. G. Sanders, Madison, Wis.; *Chionaspis, Hemichionaspis* and *Phenacaspis* of the world: R. A. Cooley, Bozeman, Mont.

HYMENOPTERA.—*Tenthredinidae* and *Uroceridae*: *A. D. MacGillivray, 603 W. Michigan Ave., Urbana, Ill.; *Aphidiinae* and *Ophiinae*: A. B. Gahan, College Park, Md.; *Chalcidoidea*: A. A. Girault, Nelson (Cairns), Queensland, Australia; *Megastimus*: C. R. Crosby, Cornell Univ., Ithaca, N. Y.; *Sphecidae*: H. T. Fernald, Amherst, Mass.; *Apoidea*: E. G. Titus, Logan, Utah; from Nebraska, Myron H. Schwenk, Lincoln, Neb.

MALLOPHAGA & ANOPLURA.—*V. L. Kellogg, Stanford Univ., Cal.

NEUROPTERA.—W. E. Hinds, Auburn, Ala.

ORTHOPTERA.—*J. A. G. Rehn, Acad. Natural Sciences, Phila., Pa.

LEPIDOPTERA.—*Rhopalocera*: Henry Skinner, Acad. Natural Sciences, Phila., Pa.

Army Worm Plague in Philadelphia (Lep.).

The army worm (*Leucania unipuncta*), the moth of which is always more or less common around Philadelphia, proved a veritable plague last year (1914). The first brood of the moth made its appearance about the twentieth of June. The young worms were noticed by the writer about July sixth, but the general public did not notice them until about July fifteenth, at which time the worms were from one-quarter to three-quarters of an inch in length. There was scarcely a section of Philadelphia that did not have more or fewer of the worms. Newspapers, of course, exaggerated the matter, although it was bad enough. I visited a number of places where the worms were said to number in the thousands, but in many cases found they could be numbered in the hundreds. In some gardens I found plenty of worms, while in adjacent gardens none were to be found. Investigation in most cases showed that the gardens seriously affected were those that were not kept in order—long grass and weeds having full possession. Contrary to the generally accepted theory, that the worms ate the grass clean down to the ground, I found that they often left from a quarter to a half inch of the base of the grass blade remaining. It has been noticed that the army worm ofttimes becomes a plague when a wet season follows a dry one, and this was just the condition of affairs around Philadelphia last year. Our spring was unusually dry, little rain fell during the month of April, and only four and a half inches during the two months of May and June. July was just the opposite, seven and three-quarter inches of rain falling. The majority of worms reached their full growth about the first of August. The moths from these worms started to emerge from the pupa about the eighth of August, the great majority emerging between the tenth and thirteenth. The moth is attracted to the electric light, but not to such an extent as one would suppose, considering the number of moths there are around. While sugaring for moths, *Leucania unipuncta* often proves a nuisance, coming in such numbers to the bait as to preclude the more desirable moths that the collector wishes to secure. The second crop of full grown worms was observed around the eighteenth of September, but they were so few in number that the general public did not notice them. Spraying with a mixture of arsenate of lead and water, and the sieving of dry slacked lime over the places infested, was found to be effective in destroying the worms. A mixture of Paris green and bran was recommended, and used to some extent, but some of our bird friends objected to this method, claiming that many of our birds lost their lives through its use.—PHILIP LAURENT, Mt. Airy, Philadelphia.

Two Rare Wasps (Hym.).

In the Rehn and Hebard material I have found two species of Hymenoptera which I think should be recorded.

Mutilla slossonae Fox. Tr. Am. Ent. Soc. XXV, p. 273, March, 1899, Type locality Florida, described from one specimen, a female. A second specimen was captured at Loggerhead Key, Dry Tortugas, Fla., July 8, 1912. This is also a female.

Sphecius hogardii Latreille, described under *Stizus* in Gen. Crust. et Ins. I, pl. xiii, f. 12, 1806. Type locality, "S. Domingue." There are six specimens from Cuba and one from San Domingo in the collection of the American Entomological Society. R. and H. turned up a female at Long Key, Monroe Co., Fla., July 13, 1912, this being, as far as I know, the first specimen from the United States.—Geo. M. Greene.

Dragonflies Devouring Winged Ants (Odon., Hymen.).

On the morning of April 15, 1912, as I was sitting on the hotel porch at New Smyrna, Florida, about 10 o'clock, I observed a large number of dragonflies gathering and circling through the air. The number of these insects increased until they were as numerous as I ever saw insects around an arc light in a northern county seat in mid-summer. There appeared to be several species: one a very large brilliant green, one that seemed purplish and one that was smaller and showed brownish-red. Upon going to the place about which they were circling, I discovered a swarm of winged ants upon a front fence post. These, when they had climbed the post to the top, took wing, sometimes singly, sometimes many at once. The gathering dragonflies would dart upon them and seize and devour them. Many were caught before they were a yard above their starting place. None appeared to rise higher than 20 feet. We watched them for some minutes and in that time, while hundreds took wing, none appeared to escape their enemies. A dragonfly seldom missed his mark. If an ant was missed, another destroyer got it. The dragonflies are generally known here as mosquito hawks. By the time the first colony of winged ants was gone another smaller company made its appearance about the porch foundation and the dragonflies turned their attention there until they were destroyed.—Amos W. Butler, Indianapolis, Indiana.

[This note recalls the observation by Mr. C. W Johnson, recorded in the News, Vol. x, p. 219, Sept., 1899, to the effect that *Aeshna ingens*, probably the "very large brilliant green" species mentioned above, "is extremely destructive to bees in Florida," and also the remark of Mr. Davis, *l. c.*, xxv, p. 191, on dragonflies catching smaller butterflies in the same State.—Ed.]

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of the American Entomological Society, Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **11**—Annals and Magazine of Natural History, London. **18**—Ottawa Naturalist. **22**—Zoologischer Anzeiger, Leipzig. **40**—Societas Entomologica, Zurich. **42**—Journal, Linnean Society, Zoology, London. **50**—Proceedings of the U. S. National Museum. **51**—Novitates Zoologicae, Tring, England. **56**—Mittheilungen, Schweizerischen entomologischen Gesellschaft, Schaffhausen. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **123**—Bulletin, Wisconsin Natural History Society, Milwaukee. **141**—Proceedings, Indiana Academy of Sciences, Indianapolis. **143**—Ohio Naturalist. **153**—Bulletin of the American Museum of Natural History, New York. **166**—Internationale Entomologische Zeitschrift, Guben. **169**—"Redia," R. Stazione di entomologia Agraria in Firenze. **179**—Journal of Economic Entomology. **186**—Journal of Economic Biology, London. **193**—Entomologische Blatter, Cassel. **207**—Anales, Academia de Ciencias Medicas, Fisicas y Naturales de la Habana, Revista Cientifica. **279**—Jenaische Zeitschrift fur Naturwissenschaft. **303**—Entomologiske Meddelelser, udgivne af Entomologisk Forening, Copenhagen. **324**—Journal of Animal Behavior, Cambridge. **335**—Smithsonian Miscellaneous Collection. **369**—Entomologische Mitteilungen, Berlin-Dahlem. **394**—Parasitology, Cambridge, England. **411**—Bulletin of the Brooklyn Entomological Society. **434**—Abhandlungen k. k. Zoolog.-Botanisch. Gesellschaft in Wien. **447**—Journal of Agricultural Research, Washington. **457**—Memoirs of the Coleoptera, by Thos. L. Casey, Washington. **490**—The Journal of Parasitology, Urbana, Illinois. **491**—The Annals of Applied Biology, Cambridge, England. **492**—Transactions of the San Diego Society of Natural History. **493**—Oregon Agricultural College Experiment Station, Corvallis.

GENERAL SUBJECTS. Berlese, A.—Intorno alle metamorfosi degli insetti, **169,** ix, 121-38. **Chittenden, F. J.**—Pollination in orchards, **491,** i, 37-42. **Comstock, J. H.**—The Comstock Memorial. (Official Pub. of Cornell Univ., V. No. G.) **Escherich & Schwangart**—Zeitschrift fur angewandte entomologie. Band 1, Heft 2, Berlin. **Fuchs, C.**—Recollections of C. Fuchs by C. W. Leng, **411,** ix, 73-6. **Grinnell, F., Jr.**—The development of California entomology, **411,** ix, 67-73. **Headlee, T. J.**—Some data on the effect of temperature and moisture on the rate of insect metabolism, **179,** vii, 413-17. **Holmes, S. J.**—Literature for 1913 on the behavior of the lower invertebrates, **324,** iv, 383-93. **McIndoo, N. E.**—The olfactory sense of insects, **335,** lxiii, No. 9. **Standfuss, G.**—Auf grund der hinterlassenen tagebucher von seinen sohne M. Standfuss, **166,** viii, 139-40 (cont.). **Turner, C. H.**—(See under Arachnida.)

PHYSIOLOGY AND EMBRYOLOGY. Brun, R.—Die raumorientierung der Ameisen und das orientierungsproblem im allgemeinen (Jena, C. Fischer, 1914), 234 pp. **Dexter, J. S.**—The analysis of a case of continuous variation in Drosophila by a study of its linkage relations, **3,** xlviii, 712-58. **Foot & Strobell**—Results of crossing Euschistus variolarius and Euchistus servies with reference to the inheritance of an exclusively male character, **42,** xxxii, 337-73. **Forster, W. D.**—Observations of the eggs of Ascaris lumbricoides, **490,** i, 31-6. **Lomen, F.**—Der hoden von Culex pipiens, **279,** lii, 567-628. **Morgan, T. H.**—The failure of ether to produce mutations in Drosophila, **3,** xlviii, 705-11.

MEDICAL. Jennings, A. H.—Summary of two years' study of insects in relation to pellagra, **490,** i, 10-21. **Riley, W. A.**—Dr. Nott's theory of insect causation of disease, **490,** i, 37-9.

ARACHNIDA, ETC. Macnamara, C.—The snow-flea. **18,** 1914, 110-12. **Nuttall, G. H. F.**—Penetration of Ixodes beneath the skin; Tick abnormalities, **394,** vii, 250-7; 258-9. **Turner, C. H.**—Literature for 1913 on the behavior of spiders and insects other than ants, **324,** iv, 394-413.

Banks, N.—New West Indian spiders, **153,** xxxiii, 639-42. **Ewing, H. E.**—The common red spider or spider mite, **493,** Bul. No. 121, 95 pp.

NEUROPTERA, ETC. Petersen, E.—New genera and species of Mecoptera, **303,** 1914, 129-32. **Bagnall, R. S.**—Brief descriptions of new Thysanoptera, **11,** xiv, 375-81.

ORTHOPTERA. Meissner, O.—Ueber den einfluss der temperatur auf die entwicklungsdauer von Dixippus morosus, **40,** xxix, 83-4. **Strindberg, H.**—Beitrage zur kenntnis der entwicklung der Orthopteren (Dixippus morosus), **22,** xlv, 7-14.

Burr, M.—Notes on the Forficularia. More new species, **11,** xiv, 420-8. **Kostir, W. J.**—Additions to the known Orthopterous fauna

of Ohio, **143,** xv, 370-4. **Rehn & Hebard.**—Studies in American Tettigoniidae. I.—A synopsis of the species of the genus Scudderia. II.—A synopsis of the species of the genus Amblycorypha found in America north of Mexico [four new], **2,** xl, 271-344.

HEMIPTERA. Davidson, J.—On the mouth parts and mechanism of suction in Schizoneura lanigera, **42,** xxxii, 307-30. The host plants and habits of Aphis rumiçis, with some observations on the migration of, and infestation of, plants by Aphides, **491,** i, 118. **Hindle, E.**—Note on a leg abnormality in Acanthia lectularia, **394,** vii, 260. **Murray, C. H.**—Notes on the anatomy of the bed bug (Acanthia lectularia), **394,** vii, 278-320. **Rust, E. W.**—Notes on Coccidae found in Peru, **179,** vii, 467-73. **Van Duzee, E. P.**—A preliminary list of the Hemiptera of San Diego County, California [many n. sps.], **492,** ii, 1-57.

del Guercio, G.—Intorno ad alcuni Omotteri cecidogeni dell Argentina. Un nuovo genere americano di Callipterini [Siphonocallis], **169,** ix, 151-67; 293-4. **Theobald, F. V.**—Notes on the green spruce aphis (Aphis abietina), **491,** i, 22-36. **de la Torre Bueno, J. R.**—New neotropical Heterocera, **411,** ix, 79-84. **Van Duzee, E. P.**—Nomenclatural and critical notes on Hemiptera, **4,** 1914, 377-89.

LEPIDOPTERA. Pearsall, R. F.—Short studies in Geometridae, **411,** ix, 76-9. **Standfuss, M.**—Mitteilungen zur Vererbungsfrage unter heranziehung der ergebnisse von zuchtexperimenten mit Aglia, nebst ausblicken auf den vererbungsmodus der rassenmeschlinge und...**56,** xii, 238-308. **Standfuss, R.**—Der aussere genitalapparat der Lepidopteren und seine biologische bedeutung, **56,** xii, 201-10. **Warren, W.**—New species of Drepanulidae, Noctuidae and Geometridae in the Tring Museum, **51,** xxi, 401-25.

DIPTERA. Cameron, A. E.—A contribution to a knowledge of the belladonna leaf-miner, Pegomyia hyoscyami, its life history and biology, **491,** i, 43-76. **Felt, E. P.**—List of zoophagous Itonididae, **179,** vii, 458-9. **Hyde, R. R.**—Inheritance of the length of life in Drosophila ampelophila, **141,** 1913, 113-24. **Muir, F.**—On the original habitat of Stomoxys calcitrans, **179,** vii, 459-60. **Wadsworth, J. T.**—Some observations on the life history and bionomics of the knapweed gall-fly, Urophora solstitialis, **491,** i, 142-69.

Cockerell, T. D. A.—A new cecidomyiid fly [Microcerata iridis], **179,** vii, 460. **Enderlein, G.**—Dipterologische studien XIII.—Weitere beitrage zur kenntnis der Pantophthalmiden, **22,** xliv, 577-86. **Felt, E. P.**—Arthrocnodax constricta n. sp., **179,** vii, 481. **Hendel, F.**—Die arten der Platystominen [Rivellia coquilletti], **434,** viii, 1-409. **Knab, F.**—Un nuevo Chaoborus cubano, **207,** l, 1003-4. **Krober, O.**—Das genus Stylogaster, **369,** iii, 338-53. **Pazos, J. H.**—Catalogo de los Dipteros de la Isla de Cuba, **207,** l, 990-1003. **Van**

Duzee, M. C.—Notes on Sciapus, with descriptions of three new species, **4,** 1914, 398-93.

COLEOPTERA. Blunck, H.—Die entwicklung des Dytiscus marginalis vom ei bis zur imago, **97,** cxi, 77-151. **Brooks, F. E.**—Apple root borer (Saperda candida), **447,** iii, 179-85. **Girault, A. A.**—The probable best method of rearing certain Scarabaeid larvae, **179,** vii, 445-7. **Lehr, R.**—Die sinnesorgane im innern des Pedicellus von Dytiscus marginalis mit besonderer berucksichtigung des Johnstonschen organes, **97,** cxi, 428-44. **Parks, T. H.**—Effect of temperature upon the oviposition of the alfalfa weevil (Phytonomus posticus), **179,** vii, 417-21. **Urban, C.**—Beitraege zur lebensgeschichte der kaefer III, **193,** x, 225-31. **Webb, J. L.**—Notes on the rice water-weevil (Lissorhopterus simplex), **179,** vii, 432-38.

Bickhardt, H.—Das system der Histeriden. Neue Histeriden und bemerkungen zu bekannten arten, **193,** x, 305-8; 309-16. **Casey, T. L.**—Studies in Omus and Cicindela. [Omus, 5 new; Cicindela, 10 new]; Some observations on the Carabidae including a new subfamily. [2 n. gen., 21 n. sps.]; A revision of the Nearctic Harpalinae. [Many new genera and species]; A review of the genus Thyce and of the No. American species of Polyphylla [Thyce, 12 new; Polyphylla, many new]; Miscellaneous notes and new species [Cicindelidae, 3; Bostrychidae, 7; Cerambycidae, 12; Lucanidae, 2; Passalidae, 2; Scarabaeidae, 4; Tenebrionidae, 3], **457,** v, 1-24; 25-44; 45-305; 306-54; 355-78.

HYMENOPTERA. Tower, D. G.—Notes on the life history of Prospaltella perniciosi, **179,** vii, 422-32. **Wardle, R. A.**—Preliminary observations upon the life-histories of Zenillia pexops, and Hypamblys albopictus, **186,** ix, 85-105.

Cockerell, T. D. A.—Descriptions and records of bees. [Melissodes helianthophila, bidentis, Osmia conjuncta marilaunidii, Hoplitis monardae], **11,** xiv, 361-9. **Girault, A. A.**—The chalcidoid family Trichogrammatidae, **123,** xii, 53-71. **Meade-Waldo & Morley**—Notes and synonymy of H. in the collection of the British Museum, **11,** xiv, 402-10. **Munro, J. W.**—A braconid parasite on the pine weevil (Hylobius abietis), **491,** i, 170-6. **Rohwer, S. A.**—Description of a new sawfly injurious to strawberries. [Empria fragariae], **179,** vii, 479-81. **Viereck & Cockerell**—New No. American bees of the genus Andrena [many new species], **50,** xlviii, 1-58.

Die Grossschmetterlinge der Erde. Von Dr. Adalbert Seitz. Stuttgart, 1914.—Volume three of this colossal work has been completed, with 511 pages, 75 plates and 4338 figures. It marks an epoch in bookmaking in the Lepidoptera. This particular volume is devoted to the family Noctuidae, and as thousands of species are beautifully and accurately figured in color, it makes the work of the systematist a

pleasure instead of a burden to use it. To wade through numerous descriptions in numerous publications to identify species is a labor that few care to undertake. With a majority of the species in the Palæarctic fauna figured, it will be possible for students to take up special work and add greatly to the sum of our knowledge of these insects. A good figure is worth no end of "word pictures," but this should not be considered as advocating the doing away with descriptions entirely. Descriptive work should supplement the illustrations. The indices are properly alphabetically arranged and the letter press excellent. Species arranged under genera in an index is a most unfortunate arrangement in some works and conducive to profanity. Such a work as this will of necessity stimulate study and research and induce more students to take up the study of this branch of entomology. Dr. Seitz is to be congratulated on his industry and perseverance in getting out such a monumental work. It is to be hoped that he will be able to go on with the other parts of it.—H. S.

Doings of Societies.

FELDMAN COLLECTING SOCIAL.

Meeting of September 16, 1914, at the home of H. W. Wenzel, 5614 Stewart Street, Philadelphia. Thirteen members were present. President Wenzel in the chair.

Mr. Daecke said that some years ago, while at Bamber, New Jersey, in company with Mr. Fenninger, he had attempted to catch a large black *Mydas* (Dip.) which finally disappeared, but he had seen enough to identify it as *M. tibialis* Wied., a species generally found in Mexico, though the type locality is Baltimore, Maryland. He exhibited a specimen of this species collected by J. E. MacNeal at Perdix, Pennsylvania, July 19, 1914. He had received a species of Diptera, *Cordyligaster minuscula* V. der W., from Mr. Banks in East Falls Church, Virginia, and had captured the same species near Marietta, Pennsylvania, July 14, 1914. Also exhibited a moth rare in this State, *Calpe canadensis* Bethune, Riverview, June 23, 1914, and a beetle, *Purpuricenus axillaris* Hald., Rockville, Pennsylvania, July 19, 1914, which is of an unusual color, red instead of yellow.

Dr. Castle said he had been to Pine Beach, New Jersey, and the only species of Coleoptera common there was *Calosoma scutator* Fabr., which he had seen in great numbers.

Mr. Kaeber said he had found *Sitodrepa panicea* Linn. (Col.) in barley which he placed in a jar. After two years the

barley has entirely disappeared and the beetles all killed by a fungus disease.

Mr. H. A. Wenzel exhibited and recorded the following Coleoptera: *Saperda discoidea* Fabr. beaten from hickory along Cobbs Creek and Naylors Run, Pennsylvania, from latter part of June to September; in June males were more numerous than females, but toward the end of August the reverse was the case. *Oncideres cingulata* Say he had collected himself for the first time this year, the first specimen August 16 and the last September 6 in the same locality as the *Saperda*. The girdled twigs were also shown.

Mr. Geo. M. Greene exhibited *Sandalus petrophya* Knoch (Col.) collected by himself at East Falls Church, Virginia, August 7, 1914 (1), August 11, 1914 (2) and August 13, 1914 (1), all females and taken on oak. On August 16, 1914, at Overbrook, Pennsylvania, he had taken a male on oak and found a female ovipositing on beech. Also exhibited *Elater militaris* Harr., Ardmore, Pennsylvania, May 5, 1912. Recorded a specimen each of *Catocala relicta* Walker (Lep.), Overbrook, Pennsylvania, August 16, 1914, and *Papilio philenor* Linn., East Falls Church, Virginia, August 13, 1914.

Dr. Skinner said that the latter was very common at one time, but owing to the medicinal properties of its food plant it is now rare. He had planted some of its food plant in his yard at Ardmore, Pennsylvania, to see if he could attract specimens and later found the larvae on the bush. When these became full grown he placed them in a box, but the remaining larvae ate them as quickly as they pupated, although there was plenty of the food plant in the box.

Adjourned to the annex.

Meeting of October 21, 1914, at the same place. Thirteen members present. President Wenzel in the chair.

Mr. Laurent exhibited specimens of three species of Coleoptera captured at Mt. Airy, Pennsylvania, this year, as follows: *Strongylium tenuicolle* Say, July 21; *Xylotrechus quadrimaculatus* Hald., July 22, and *Myas coracinus* Say, July 22.

He stated that all three were rare, particularly the last, the specimen shown being the second he had captured during the thirty-six years he has been collecting.

Mr. Geo. M. Greene exhibited a specimen of *Dizonias lucasi* Bell. (Dip.) from the Rehn and Hebard material. This was collected at Long Key, Monroe County, Florida, July 13, 1912, Aldrich's List giving Mexico as habitat.

Mr. Daecke exhibited a roach from Harrisburg, Pennsylvania, September 25, 1913, with a species of fungus growing from it. Also *Rhagoletis cingulata* Loew (Dip.), which he collected at Riverview, Pennsylvania, June 23, 1914, on wild cherry, a species very rare here but commoner in the northern part of the State, New York and Canada. Mentioned a paper by C. W. Johnson on *Criorhina* and *Blera* (Dipt.) and exhibited *B. badia* Wlk., Castle Rock, June 3, 1914, and Inglewood, Pennsylvania, June 27, 1912, and *B. confusa* Johns. Digby, Nova Scotia, June 22, 1908 (J. Russell) and El Paso County, Colorado, July 2, 1914 (H. B. Champlain).

Mr. H. W. Wenzel exhibited his collection of *Oncideres, Saperda,* etc.

Dr. Castle said he had found two species of ground fungus, one at Pine Beach, New Jersey, September 14, and the other at Morton, Pennsylvania, September 20, which he had placed in separate boxes, and on September 25, one species of beetle, *Caenocara oculata* Say, began emerging from both by the thousands.

Adjourned to the annex.

GEO. M. GREENE, *Secretary.*

OBITUARY.

The month of November, 1914, witnessed the death of two distinguished naturalists, neither of whom was known primarily as an entomologist, although both of them did important work upon insects. Friedrich Leopold August Weismann died November 6, Charles Sedgwick Minot on November 19.

AUGUST WEISMANN, as his name commonly appeared, was born in 1834, at Frankfurt-am-Main, and studied Zoology under Henle at Göttingen and Leuckart in Giessen. Since 1866, he was Professor of Zoology and Director of the Zoological Institute of the University at Freiburg im Breisgau, Baden. In later years he bore the titles of Exzellenz and Wirklicher Geheimrat. The Royal Society of London elected him a foreign member in 1910, and the Entomological Society of London one of its twelve honorary fellows in 1898. He was recently reported to have renounced all his English distinctions. To zoologists generally and to the world at large he is chiefly known for his writings on the theory of Evolution and its correlations. The titles of the English translations of his works on these subjects are familiar to a wide range of readers: *Studies in the Theory of Descent* (translated by R. Meldola), 1880-81; *Essays Upon Heredity and Kindred Biological Problems* (edited by E. B. Poulton and others), 2 vols., 1889 and 1892; *The Germ Plasm, a Theory of Heredity*, 1893; *The Evolution Theory*, 2 vols., 1904; *The Selection Theory* (in Seward's *Darwin and Modern Science*), 1909. All of them contain many references to insects.

In these writings he emphasized the importance of the separation of the germ plasm from the somatic, or body, plasm from the earliest stages of individual development, and exposed the lack of definite evidence for the hereditary transmission to offspring of characters acquired during the life of an individual. In his famous controversy with Herbert Spencer, in the *Contemporary Review* for 1893, he appeared as the champion of the "All-Sufficiency of Natural Selection." Still later, in 1895 and 1896, he answered, theoretically at least, many objections which had been brought against Natural Selection by the formulation of the idea of Germinal Selection.

To Weismann are due such terms and expressions as biophors, amphimixis, idants, determinants, ids, continuity of the germ plasm, etc., which appeared so frequently in discussions of evolution and heredity in the last decade of the nineteenth century and the first of the twentieth, and during this period no one influenced biological thought more than he.

The development of insects early interested him, and the *Abhandlungen* of the Senckenberg Society of his native town for 1862-63 contains one of his first papers on this subject: *die Entstehung des vollendeten Insektes in der Larve und Puppe.* A paper on the embryology of various insects appeared in 1864 in the *Archiv für Anatomie und Physiologie.* The *Zeitschrift für Wissenschaftliche Zoologie* for 1863 and 1864 contained those two great memoirs, *Die Entwicklung der Dipteren im Ei* and *Die nachembryonale Entwicklung der Musciden,* results of nearly four years' work. The first of these dealt with the embryonic development of *Chironomus, Musca vomitoria* and *Pulex canis.*

> From the second [Weismann wrote at the time] one will see how, in a very unexpected manner, the head and thorax of the fly together with their appendages are already formed in the larva, nay in the embryo, how they arise in the interior of the body cavity separated from each other and, after pupation, grow together into the parts of the fly's body. . . . . But not only the walls of the body in the family of the Muscidae exhibit such a peculiar history but also the internal organs are reformed anew in a surprising manner out of the entirely destroyed larval body.

It was in this memoir that the term "imaginal disks" (Imaginalscheiben) was first applied to those minute parts present in the larva from which the imaginal, head, thorax and appendages are formed. In 1866 appeared, in the same *Zeitschrift, Die Metamorphose der Corethra plumicornis,* in which its continuous development was contrasted with the discontinuous type represented by *Musca.* In the *Festschrift* for his teacher Henle, in 1882, were his *Beiträge zur Kenntniss der ersten Entwicklungsvorgänge im Insectenei.*

Another entomological topic to which Weismann directed his attention was the seasonal dimorphism of the Lepidoptera, not merely to solve that particular problem but also to take, as he hoped, a step forward in the question of the transformation of species. A paper of 94 pages on this subject in the *Annali* of the Genoa Museum for 1874 appeared also as the first of his *Studien zur Descendenz-Theorie* (Leipzig 1875).

The second (1876) of these *Studien* dealt with the origin of

the markings of Lepidopterous caterpillars (137 pages), and with the phyletic parallelism of metamorphic species (85 pages), discussing insects of different orders.

A short paper in the Zoologischer Anzeiger for 1878 treats of the scent-scales of butterflies.

CHARLES SEDGWICK MINOT was born in West Roxbury, Massachusetts, December 23, 1852. In his seventeenth year he was publishing descriptions of the male of *Hesperia metea* Scudder, of four new species of Geometridae and three new species of Phalaenidae, and discussing, but very briefly, the limits of genera, in the twelfth and thirteenth volumes of the *Proceedings of the Boston Society of Natural History,* and furnishing *Brief Notes on the Transformations of Several Species of Lepidoptera* [Heterocera] to the second volume of the *Canadian Entomologist.* In the following year (1870) some *Notes on the Flight of New England Butterflies* gave a classification of the characteristic manners of flight of different genera, briefly considered the influence of the size of the thorax and the shape of the wings in relation thereto, commented on the position of butterflies when at rest and as to where they spend the night (Proc. B. S. N. H., xiv, 55). In 1872 the *Canadian Entomologist* published his *Notes on Limochores bimacula.* In the same year came his graduation from the Massachusetts Institute of Technology (1872) and then a period of study (1873-6) in Leipzig, Paris and Würzburg. Here belong his *Recherches Histologiques sur les Trachées de l'Hydrophilus piceus* (Archives Physiol. Norm. Path., 2, iii, 1876), made in the histological laboratory of the College de France.

After his return to America, at the desire of Dr. A. S. Packard, Jr., he undertook a study of the anatomy and histology of various Orthoptera "in connection with the more directly practical labors of the U. S. Entomological Commission." The results appeared in the *First* and *Second Reports* of the Commission respectively, under the titles *Report on the Fine Anatomy of the Locust* (1878), and *Histology of the Locust* (*Caloptenus*) *and the Cricket* (*Anabrus*) with seven plates (1880).

This latter was Dr. Minot's most important piece of entomological work, and we know of at least one laboratory in which it is still used as a guide and book of reference. A summary of some of these histological investigations saw the light also in *The American Naturalist* for June, 1878, as *A Lesson in Comparative Histology.*

To the Fourth Report of the Commission, in conjunction with Edward Burgess, he contributed an account of the *Anatomy of Aletia xylina* (1884), larva and imago, prepared at the request of Prof. C. V. Riley. A paper in German, *Zur Kenntniss der Insectenhaut* (Archiv. f. mikros. Anatomie 1886), also dealt with Lepidoptera, especially their larvae, and contains the interesting conclusion: "even a piece of cuticle suffices for the identification of the species."

This appears to have ended Dr. Minot's entomological career. He entered the service of Harvard Medical School, where he remained for the rest of his life, first as Lecturer on Embryology and Instructor in oral pathology and surgery (1880-3), then as Instructor in Histology and Embryology (1883-7), Assistant Professor (1887-92), Professor (1892-1906), and finally as Professor of Comparative Anatomy from 1906 to his death. His attention became chiefly directed to the Vertebrates, as the titles of his books show: *Human Embryology* (1892), *Bibliography of Vertebrate Embryology* (1893), *A Laboratory Textbook of Embryology* (1903), or to more general topics like *Age, Growth and Death* (1908), and *Modern Problems of Biology* (1913), the latter his lectures as exchange professor at the University of Jena in 1912. As an inventor of useful forms of automatic microtomes during this later, "vertebrate," period of his career, he aided entomological investigators quite as much as he helped others. From 1897 on he was President of the Boston Society which had published his earliest papers, and in 1901 President of the American Association for the Advancement of Science.

P. P. C.

The NEWS for December, 1914, was mailed at the Philadelphia Post Office November 30, 1914.

EXCHANGES.

Not Exceeding Three Lines Free to Subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued

---

Wanted—60 *Heliophila unipuncta*, one dozen imagines of any species of any order that are very distructive to cotton. 12 cotton weevil beetles, 12 *B. disippus*, *P. huntera* 35, 6 pair *M. phaeton*, *A. celtis* 4, 4 *Debis portlandia*, 6 each of any *Papilio*, all in papers with data.—A. F. Porter, Decorah, Iowa.

I have 200 local species of named Microlepidoptera, mostly Pyralidae and Tortricidae, which I offer in exchange for North American Macrolepidoptera, Noctuidae and Geometridae particularly.—G. Chagnon, P. O. Box 521, Montreal, Canada,

Wanted to correspond with collectors in South America, to exchange Lepidoptera in papers.—Frank Prokes, 2716 South Sacramento Avenue, Chicago, Ill.

Wanted—Psyche, Vol. viii, No. 265 (May, 1898); No. 267 (July, 1898); No. 268 (August, 1898); Vol. ix, No. 300 (April, 1901). Address, giving price, Librarian, Stanford University, Cal.

For Exchange—Bred examples of *Abbottana clematalia*, *Empretia stimulea*, *Phobetron pithecium* and many other species of Lepidoptera from this locality, both Macros and Micros.—Fred. Marloff, Box 104, Oak Station P. O., Allegheny County, Pa.

For Exchange—Lepidoptera, Diptera, Coleoptera, Hymenoptera, Hemiptera and Homoptera to exchange with American or foreign collectors. Some foreign material on hand also.—Harry L. Johnson, South Meriden, Conn.

Exchange—Californian butterflies for those from other parts of North America. Also want *N. terlooi*.—Victor G. Duran, 937 South Kenmore Ave., Los Angeles, Calif.

Wanted—Entomological News, Vol. II, Nos. 6 and 10, to complete files.—Address W. E. Britton, Agr. Exp. Station, New Haven, Conn.

For Exchange—Pupae of *Amp. versicolor*, *Dolba hylaeus*, *S. geminatus*, *P. achemon* and others, also Noctuidae and Geometridae from this locality.—Ernst Frensch, Stonington, Conn.

Cicindelidae—Wanted Cicindelidae of North America and Mexico. Please send lists. Correspondence desired with collectors in all parts of the country.—Edwin E. Calder, Longmeadow, Rhode Island.

Ipidae (Scolytidae)—Will exchange for eastern, northern or southern species the Pacific Coast species *Dendroctonus brevicornis*, *monticolae*, *jeffreyi*, *valens*, *Ips confusus*, *oregoni*, *emarginatus*, *concinnus*, *latidens*, *Pityogenes carinulatus*, *Phloeosinus punctatus*, *cupressi*, *Hylurgops subcostulatus*, etc —Ralph Hopping, 114 Sansome St., San Francisco, Cal.

EXOTIC INSECTS—An experienced Collector who has made a special study of Tropical Work, desires collecting commission from Museums or Private Entomologists; can send at once fine, fresh-taken specimens of interesting and rare Neotropical insects of all orders.

W. BÜTHN

D'ABADIE, TRINIDAD, B. W. I.

LIVING COCOONS of Antherea mylitta from India $1.25; Pupae Smerinthus populi 35cts, Pieris brassicae, Pygaera bucephala 20cts. all per dozen (12), postage 10 cts., many others.

60 different British butterflies $2.50, 12 different British Sphingidae ("hawk moths") $1.25. 200 different British Noctuae or Geometrinae $6.00. All perfect specimens, correctly named and post free. 500 British Coleoptera, different, named, $10.00. 1000 species $21.00, post free. Lists from

A. FORD, Entomologist, 6 , Irving Road, Bournemouth, England. (Est. 18 years)

AT THE BEGINNING OF JULY THERE APPEARED

Volume III of the Palaearctic Fauna, Noctuae, of Seitz' Macrolepidoptera of the Earth.

4338 colored figures, true to nature, on 75 plates. Two Volumes in half-binding (text and plates) 55 Marks, exclusive of the U. S. Customs duty.

Text in English or German or French.

The present state of this monumental entomological work is as follows: The Palaearctic Section has reached part 120, consequently within five parts of completion. 199 parts on the Exotics have appeared, of which 61 refer to the American, 103 to the Indo-Australian, and 35 to the African Fauna.

Detailed prospectus and sample plates may be had from G. E. Stechert & Co., 151–155 West 25th St., New York City, or direct from the publisher,

VERLAG DES SEITZ'SCHEN WERKES (ALFRED KERNEN)
POSTSTRASSE 7, STUTTGART, GERMANY

OFFERED FOR IMMEDIATE SALE

My entire collection of North American Tortricids, about 10,000 specimens and over 1,000 species, including every described North American species, with less than twenty exceptions, and many yet not described. Hundreds of types, cotypes and paratypes.

Also my entire Entomological library of over 1,000 bound volumes and hundreds unbound. Complete sets of all American Journals, out of print State Reports, and many early publications.

Catalog will not be issued. Send list of your desiderata.

W. D. KEARFOTT - - - - MONTCLAIR, N. J.

PIN LABELS IN 4 PT. TYPE ON WHITE LEDGER PAPER, 25 CHAR. OR LESS @ 25c. PER 1000; ADD. CHAR. @ 1c. EACH
Per 1000. No charge for blank lines. One cut makes a label. All kinds of printing.
E. REHN-CASEY, 1918 N. 21st Street, Philadelphia, Pa.

EXOTIC LEPIDOPTERA.

ERNEST SWINHOE, 6 Gunterstone Road, West Kensington, London, Eng.

Explanatory and Descriptive Catalogue, priced in American Money, 10 Cents (stamps accepted).

The Celebrated Original Dust and Pest-Proof

METAL CABINETS

FOR SCHMITT BOXES

These cabinets have a specially constructed groove or trough around the front, lined with a material of our own design, which is adjustable to the pressure of the front cover. The cover, when in place, is made fast by spring wire locks or clasps, causing a constant pressure on the lining in the groove. The cabinets, in addition to being absolutely dust, moth and dermestes proof, is impervious to fire, smoke, water and atmospheric changes. Obviously, these cabinets are far superior to any constructed of non-metallic material.

The interior is made of metal, with upright partition in center. On the sides are metal supports to hold 28 boxes. The regular size is 42½ in. high, 13 in. deep, 18⅝ in. wide, inside dimensions; usually enameled green outside. For details of Dr. Skinner's construction of this cabinet, see Entomological News, Vol. XV, page 177.

METAL INSECT BOX has all the essential merits of the cabinet, having a groove, clasps, etc. Bottom inside lined with cork; the outside enameled any color desired. The regular dimensions, outside, are 9 x 13 x 2½ in. deep, but can be furnished any size.

WOOD INSECT BOX.—We do not assert that this wooden box has all the qualities of the metal box, especially in regard to safety from smoke, fire, water and dampness, but the chemically prepared material fastened to the under edge of the lid makes a box, we think, superior to any other wood insect box. The bottom is cork lined. Outside varnished. For catalogue and prices inquire of

BROCK BROS., Harvard Square, Cambridge. Mass.

WARD'S NATURAL SCIENCE ESTABLISHMENT

84-102 COLLEGE AVENUE
ROCHESTER. N. Y.

Having purchased the entire stock and trade of the **American Entomological Co., of Brooklyn, N. Y.**, we are in a position to furnish entomological specimens of all kinds.

LIFE HISTORIES OF INSECTS of Economic Importance.—We supply all other dealers with same. We are also manufacturing the only genuine **Schmitt Insect Boxes, Cabinets and Exhibition Cases** of the highest standard and the **American Entomological Company Insect Pins**—The quality of these is known to all entomologists.

RIKER MOUNTS at the lowest possible prices.

Living pupae in season. If you are in need of Natural History specimens or supplies of any kind, send us a list of your requirements.

Ward's Natural Science Establishment

FOUNDED 1862 **INCORPORATED 1890**

When Writing Please Mention "Entomological News."

THE KNY-SCHEERER COMPANY

Department of Natural Science **404-410 W. 27th St., New York**

North American and Exotic Insects of all orders in perfect condition
Entomological Supplies **Catalogue gratis**

INSECT BOXES—We have given special attention to the manufacture of insect cases and can guarantee our cases to be of the best quality and workmanship obtainable.

NS/3085

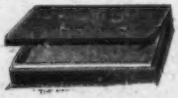
NS/3085—**Plain Boxes for Duplicates**—Pasteboard boxes, compressed turf lined with plain pasteboard covers, cloth hinged, for shipping specimens or keeping duplicates. These boxes are of heavy pasteboard and more carefully made than the ones usually found in the market.

Size 10x5½ in..... Each **$0.25**
Size 8x10½ in..... Each .15

NS/3091—**Lepidoptera Box** improved museum style, of wood, cover and bottom of strong pasteboard, covered with bronze paper, gilt trimming, inside covered with white glazed paper. Best quality. Each box in extra carton.

Size 10x12 in., lined with compressed turf (peat).
Per dozen..... 5.00
Size 10x12 in., lined with compressed cork.
Per dozen..... 6.00

Caution:—Cheap imitations are sold. See our name and address in corner of cover.



NS/3091

(For exhibition purposes)

NS/3121

NS/3121—**K.-S. Exhibition Cases**, wooden boxes, glass cover fitting very tightly, compressed cork or peat lined, covered inside with white glazed paper. Class A. Stained imitation oak, cherry or walnut.

Size 8x11x2½ in. (or to order, 8¾x10¾x2¾ in.)..... **$0.70**
Size 12x16x2½ in. (or to order, 12x15x2¾ in.)..... **1.20**
Size 14x22x2½ in. (or to order, 14x22x2½ in.)..... **2.00**
Special prices if ordered in larger quantities.

THE KNY-SCHEERER CO.

DEPARTMENT OF NATURAL SCIENCE.

G. LAGAI, Ph.D., 404 W. 27th Street, New York, N. Y.

PARIS EXPOSITION:
Eight Awards and Medals

PAN-AMERICAN EXPOSITION
Gold Medal

ST. LOUIS EXPOSITION: Grand Prize and Gold Medal

ENTOMOLOGICAL SUPPLIES AND SPECIMENS

North American and exotic insects of all orders in perfect condition.
Single specimens and collections illustrating mimicry, protective coloration, dimorphism, collections of representatives of the different orders of insects, etc.
Series of specimens illustrating insect life, color variation, etc.
Metamorphoses of insects.
We manufacture all kinds of insect boxes and cases (Schmitt insect boxes Lepidoptera boxes, etc.), cabinets, nets, insects pins, forceps, etc.
Riker specimen mounts at reduced prices.
Catalogues and special circulars free on application.
Rare insects bought and sold.

FOR SALE—Papilio columbus (gundlachianus), the brightest colored American Papilio, very rare, perfect specimens $1.50 each; second quality $1.00 each.

When Writing Please Mention "Entomological News."

P. C. Stockhausen, Printer, 53-55 N. 7th Street, Philadelphia